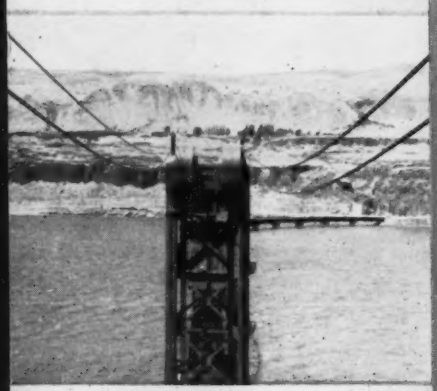
More Power Downtown 78

Light Is Prime Consideration .. 91



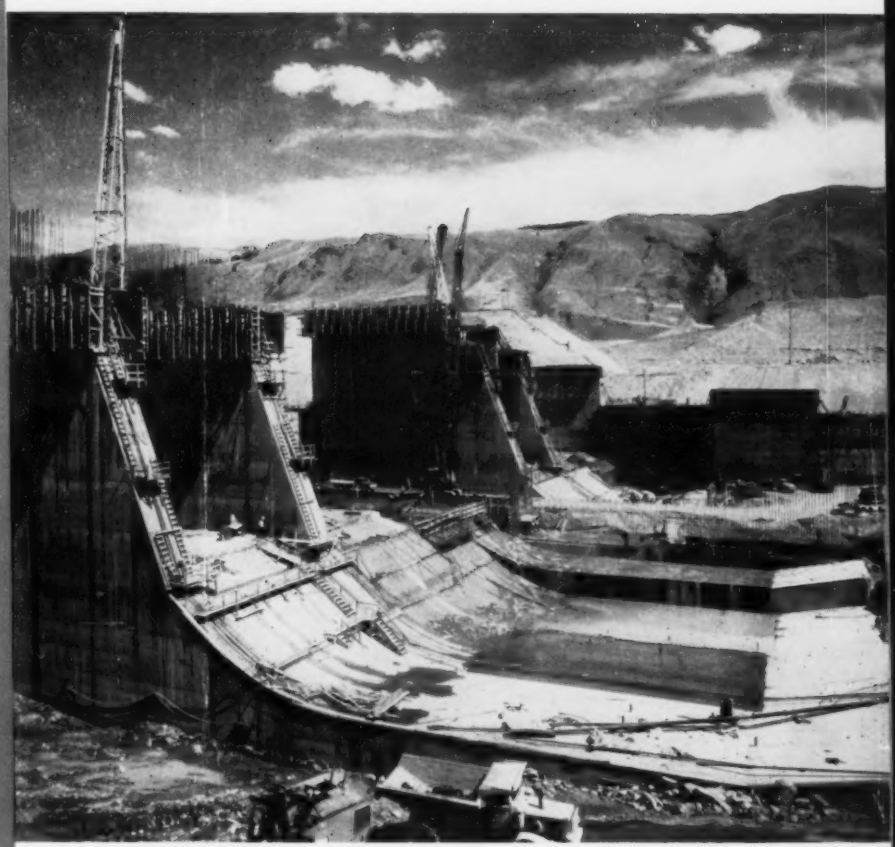
Bridge Span Control 94

Light for Living 98

ELECTRICAL WEST

January 1958
50 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.



Rocky Reach Grows 82

✓ Take the First Management Test 14

✓ Don't Sell 1958 Short! 67

✓ News of the Industry 104

Edison
is selling the
advantages
of electric drying—
to boost your
electric dryer
sales

Isn't it worth 4¢

to dry clothes

fresh-air sweet indoors?

Only Electric Dryers can do it. In an electric dryer, radiant coils warm the air inside. There's no flame, none of the by-products of combustion. It's cleaner and purer than any other way of drying. 32% fluffier than back-yard drying—and electric drying doesn't fade colors.

Electric dryers not only cost less to buy, but less to maintain. Before you tote another load out into the hot sun, see the new electric dryers at your appliance dealer.

LIVE BETTER—ELECTRICALLY · SOUTHERN CALIFORNIA Edison COMPANY

SMOOT-HOLMAN

TWIN-LUX

Luminaires

Light —tailored to fit the need

Color —controlled to fit the mood

acrylic or vinyl diffusing panels

40° x 40° plastic louvers

Entirely self-contained Smoot-Holman Twin-Lux Luminaires provide soft, diffused, localized light. The relatively large area of this shallow, two-by-four fixture controls brightness and assures uniformity of illumination. Color filters can be inserted in the louvered style to create the desired atmosphere.

- *Designed for individual installation or end-to-end mounting*
- *Require no structural or architectural changes*
- *Economical to install and maintain*

Certified Lighting

SMOOT-HOLMAN
COMPANY
INGLEWOOD, CALIFORNIA

Send for illustrated, descriptive brochure.

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S

THE ALL-INDUSTRY MAGAZINE OF PROGRESS, ESTABLISHED 1887,
and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas," & "Journal of Electricity."

Contents copyright. Seventy-first year of publication.

George C. Tenny, President
C. W. Leihy, Publisher and Editor
W. A. Cyr, Consulting Editor
Peggy Boyer, Associate Editor
Jack Robinson, Engineering Editor
Dale VanHorn, News Editor
Miriam Stuart, Editorial Assistant

Regional Editors
Frank Pitman, Intermountain
Marvin Petal, Pacific Southwest
Berkeley Snow, Pacific Northwest

CONTENTS

VOL. 120, NO. 1 JANUARY 1958

Don't Sell 1958 Short! ... 67

Big Promotion Year for the West ... 70

LBE Moves Ahead ... 74

Cut Drudgery—Stretch Engineers by A. J. Mischnick ... 75

More Power Downtown by Kenneth L. C. Dorking and J. C. Coulter ... 78

Rocky Reach Grows by Pat Thomson ... 82

What Makes a Manager? by Dr. Joseph G. Phelan ... 84

Light Is the Prime Consideration ... 91

Provide Celilo Bridge Span Control ... 94

Light for Living ... 98

DEPARTMENTS

Applications	91	How're We Doing	5
Bulletins	28	New Products	18
Editorials	60, 64	News	104
Electra's Husband	62	News Roundup	6
Engineering	75	Advertising Index	124

Next Month

February, the annual construction and statistical issue, will review 1957 construction and 1958 budgets for system additions and improvements. It will also carry Far West and national statistics and the calendar of new generation. Utility sales accomplishments for 1957 will be carried in the March issue, to give complete reports. How 1958 business development plans are shaping up is told in this issue.

ADVERTISING REPRESENTATIVES

Atlanta (3) ... Robert Powell, Rhodes Haverty Bldg.
Chicago (11) ... Michael I. O'Connell, 520 N. Michigan Ave.
Cleveland (13) ... Frank Seiler, R. A. Hubley, 1164 Illuminating Bldg., 55 Public Square
Denver (2) ... John Patten, 1740 Broadway, AL 5-2981
Los Angeles (17) ... Russ Antles, 1125 West 6th St., MA 6-9351
New York (36) ... G. W. Simpson, 500 Fifth Ave.
San Francisco (4) ... Dick Alcorn, 68 Post St., DO 2-4600

T. H. Carmody, Advertising Sales Manager
Bernice Johnston, Advertising Production Manager

Offices: Boston, Dallas, Detroit, Philadelphia, Pittsburgh, St. Louis

Electrical West (with which is consolidated The Journal of Electricity). January 1958, Vol. 120, No. 1. Published monthly except November when published semi-monthly by McGraw-Hill Company of California, James H. McGraw (1860-1948) Founder. Office of publication, 235 N. W. Park Ave., Portland 9, Ore. See panel below for directions regarding subscriptions or change of address.

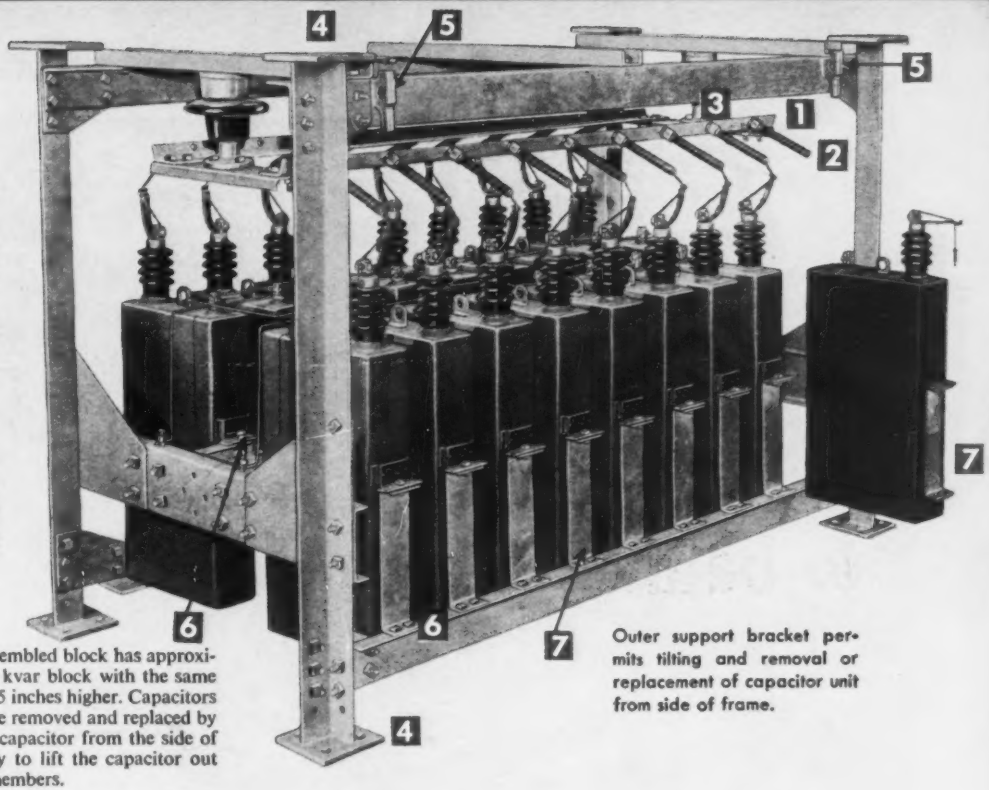
Executive, editorial, circulation and advertising offices: 68 Post St., San Francisco 4, Calif. Donald C. McGraw, chairman of the board; George C. Tenney, president; John W. Otterson, vice-president; B. M. Boccoli, secretary and treasurer.

Position and company connection must be indicated on subscription orders. Send to address shown in panel below. United States subscription rate $2 a year, single copies 50c (November directory issue $1). Latin American Republic $2 a year; Canada $2.50 a year; all other countries $4 a year. Entered as second class matter, Dec. 17, 1956, at the post office at Portland, Ore., under the act of March 3, 1879. Printed in U.S.A. Title registered in U. S. Patent Office.

© Copyright 1958, McGraw-Hill Company of California.

SUBSCRIPTIONS: Send subscription correspondence and change of address to Subscription Manager, Electrical West, 68 Post St., San Francisco 4, Calif. Allow 30 days for change of address.

Postmaster: please send notice 3579 to Electrical West, 68 Post St., San Francisco 4, Calif.



1 Aluminum-alloy bus

2 Bus-mounted fuses

3 Bus connections wire brushed and treated with oxidation inhibitor.

4 Jig-assembled for perfect alignment of mounting pad bolt holes.

5 Lifting lugs.

6 Tapped holes in frame for capacitor mounting bolts. Nuts not needed.

L-M's new 50 kvar factory-assembled block has approximately the same area as a 25 kvar block with the same number of units and it is only 5 inches higher. Capacitors in L-M's 50 kvar blocks can be removed and replaced by simply tilting and sliding the capacitor from the side of the block. It is not necessary to lift the capacitor out from between the mounting members.

Outer support bracket permits tilting and removal or replacement of capacitor unit from side of frame.

Another L-M First...

L-M's 50 Kvar Capacitor Blocks Provide Kilovars At Still Lower Costs

By **BLAINE SCHULTZ**
Chief Engineer
Capacitors and Regulators
Line Material Industries

Only half as many units are required in substation capacitor banks when you use L-M's new blocks of 50 kvar capacitors. In addition, these blocks reduce the number of fuses, footings, and base support insulators, as well as the construction man-hours required for any given-size bank. L-M 50 kvar preassembled capacitor blocks also cost less and require about 50% of the substation area per kvar in comparison with blocks containing 25 kvar capacitors.

Capacitor Unit

The internal construction of L-M's 50 kvar capacitor is identical with that of the 25 kvar unit except for the length of pack. There is no increase in voltage stress to get the higher kvar rating. The new design is the result of continued improvement in dielectric materials and manufacturing techniques.

The tank has the same width, same thickness as the 25 kvar capacitor. Only 10 inches of additional height give you twice the capacity. It also has aluminum-metallized coating under alkyd resin paint; paragroove clamp-type terminals; strong solder-sealed bushings; and low-temperature Elemex liquid dielectric.

Factory-Assembled Blocks

L-M offers a complete line of NEMA Standard 50 kvar factory-assembled blocks from 2400 through 7960 volts—400 to 1200 kvar ratings in 100 kvar increments.

Outstanding features of L-M factory-assembled blocks include:

- Aluminum-alloy bus which is not subject to cold flow.
- Bus-mounted capacitor fuses with stainless-steel flipper to eject the leader if fuse link ever blows. Leader cannot hit live parts.
- Connections to the bus are wire brushed, and treated with oxidation inhibitor.
- Height of block is increased only 5 inches, because it is so designed that capacitors can be installed and removed from the *side*. It is not necessary to provide clearance to lift the capacitor out from between the mounting members.
- Heavy galvanized frame is jig-assembled for perfect alignment of mounting-pad bolt holes.

Prompt Delivery Now

You can save on the cost of equipment, man-hours, and space in the substation when you specify L-M NEMA Standard 50 kvar capacitor equipments. Prompt delivery . . . on all sizes and voltage ratings. Ask your L-M Field Engineer for complete information on L-M's new 50 kvar factory-assembled capacitor equipments. Or write Line Material Industries, Milwaukee 1, Wisconsin.

McGRAW EDISON

296-AR

LINE MATERIAL Industries *Elemex® Capacitors*

McGRAW-EDISON COMPANY

a suit of armor to battle vibration

PREFORMED ARMOR RODS increase uninterrupted service life of conductor

The wind blows, the conductor vibrates and the life of your line is at stake. If the vibration problem is such that severe frequency and amplitude conditions are sufficiently prolonged, the conductor could begin to break regardless of the protective armor used. And, if the conductor begins to break, PLP Preformed Armor Rods have a big advantage over other armor: The rods undertake the function of an electrical and mechanical repair splice.

All armor rods greatly reduce vibration stresses, but if vibration is severe enough to cause strand breaks, other types will not prevent parting of the strands. With PLP (short pitch) Preformed Armor Rods, it's a different story; the conductor is held tightly and uniformly throughout the entire length of the rods—not at one point. You have a long, firm grip that never relaxes, that maintains conductivity in spite of the break. Thus, your line continues to function unimpaired.

There is one other Preformed advantage to keep in mind. Some types of armor require the use of bolted end-clamps that can shake loose and cause chafing. Preformed Armor Rods require no end-clamps.

For a long uninterrupted service life, Preformed Armor Rods are the best suit of armor your conductor can wear. PREFORMED LINE PRODUCTS COMPANY, 5349 St. Clair Avenue, Cleveland 3, Ohio. Cable Address: Preformed-Cleveland . . . in 10 years the leading manufacturer of armor rods, dead-ends, Guy-Grip dead-ends and other line accessories.

PLP

You can look up to **Preformed**

Made in accordance with or for use under U. S. Patent Nos. 2,609,653; 2,275,019 and 2,587,521. Other patents pending.

ELECTRICAL WEST'S
Editorial Advisory Board

Pacific Southwest Region

J. F. Davenport, Executive Vice-President
Southern California Edison Co., Los Angeles
R. H. Cockfield, Business Agent
Department of Water & Power, Los Angeles
Joseph Pengilly, Vice-President
Square D Co., Los Angeles
Leonard Hobbs, President
Smoot-Holman Co., Inglewood
Harry Gerster, Vice-President
General Electric Supply Co., Los Angeles
Sidney Hill
Hill Electric Co., Los Angeles
C. M. Smith, Sales Manager
Fluor Corp., Los Angeles
Victor Hartley, Managing Director
PCEA, Los Angeles

Northern California Region

Walter Maytham, Vice-President
Westinghouse Electric Corp., San Francisco
Norman R. Sutherland, President
Pacific Gas & Electric Co., San Francisco
Fred Nicholas
F. M. Nicholas Co., San Francisco
Alfred H. Meyer, President
Leo J. Meyberg Co., San Francisco
Arthur Dahl, Sales Manager
General Electric Supply Co., San Francisco
Paul Churchill, Regional Manager
Line Material Industries, South San Francisco
George Abbett, President
Abbett Electric Co., San Francisco
Karl Bausch, Chief Electrical Engineer
Bechtel Corp., San Francisco
Walter Bayha
Bayha, Weir & Finato, San Francisco

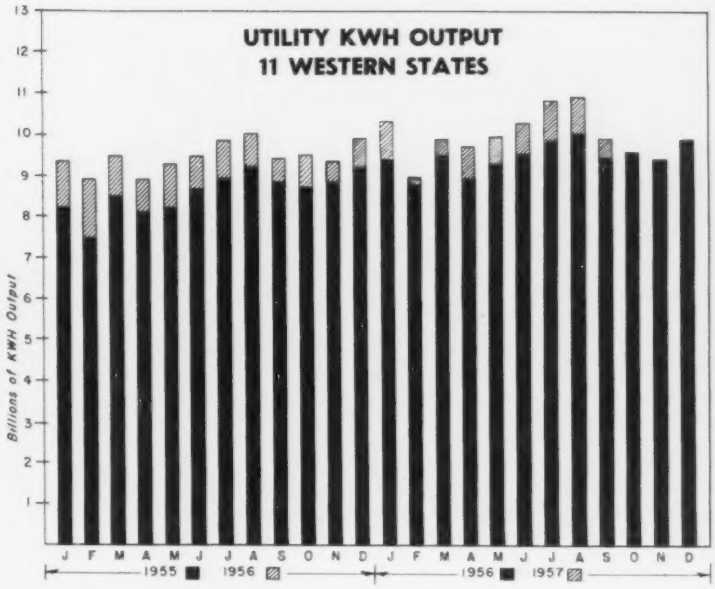
Intermountain Region

Don Hitchcock, Manager
Graybar Electric Co., Denver
R. D. Moody, Manager
Allis-Chalmers Mfg. Co., Denver
David B. Hyer Jr., President
Southern Colorado Power Co., Pueblo
R. W. Akerlow
Stearns-Roger Mfg. Co., Denver
Don Larson, Mgr., Rocky Mt. Chapter
NECA, Denver
Ralph Johnson, Vice-President & General Manager
Sturgeon Electric Co., Denver
Ken G. Eaton, District Manager
Anaconda Wire & Cable Co., Denver
Howard Peterson
Peterson Co., Denver
Ralph Hubbard, Managing Director
RMEL, Denver
W. W. Bowman, Director of Publicity
Utah Power & Light Co., Salt Lake City
A. E. Fleming, District Manager
General Electric Supply Co., Salt Lake City
John Kimball, Vice-President & General Manager
Idaho Power Co., Boise

Pacific Northwest Region

Eric Nelson
Shaffer & Nelson, Seattle
Charles C. Cutter, Northwest Representative
Federal Pacific Electric Co., Seattle
Ralph James
Northwestern Agencies, Seattle
R. B. Lane, President
Industrial Electric Co., Seattle
Beverly Travis, Consulting Engineer
Seattle
Eugene Starr, Chief Engineer
Bonneville Power Administration, Portland
Thomas W. Delzell, Chairman of Board
Portland General Electric Co., Portland
D. R. McClung, Executive Vice-President
Pacific Power & Light Co., Portland
James F. Grieve, Vice-President
C. C. Moore, Engineers, Portland
Max Wood
Schwager-Wood Co., Portland
Larry Rodgers, Manager
Oregon-Columbia Chapter
NECA, Portland
R. H. Sroufe, Executive Vice-President
Stubbs Electric Co., Portland
Alden F. Krieg, Managing Director
NELPA, Portland
Jack D. Stevens
Puget Sound Utilities Council, Seattle

----How're We Doing?



Output Comparisons

Year-to-year Kwh Output Changes in Western Regions and U. S.
Per Cent Changes Over Same Week One Year Ago

Week Ending	Rocky Mountain	Pacific Southwest	Pacific Northwest	U. S. Total
Nov. 16	+1.7	+ 6.5	+2.9	+3.1
Nov. 23	+5.1	+10.8	+3.4	+6.1
Nov. 30	+1.8	— 2.0	— 1.9	— 3.8

Big Projects Proposed

Seldom does a single month produce the galaxy of really large Western construction projects as those proposed during the past 30 days. The defense department announced plans for a $65,000,000 giant missile base near Cheyenne that can't help but have a tremendous impact on the economy of southern Wyoming.

A new industrial park near Tuckwila, Wash., is estimated to cost $100,000,000 over a 20-year development program.
Several new office buildings in San Francisco and Seattle represent another $16,000,000 addition to the construction backlog.

A $12,000,000 cement plant is planned near Ash Fork, Ariz. Multimillion-dollar shopping centers at Visalia, Tracy, Baron and Garden Grove, Calif., and another south of Seattle will cost $24,000,000. . . Additions to college buildings at Provo, Utah, Los Angeles, Denver are expected to cost more than $25,000,000.

New housing projects include subdivisions at Lancaster, Los Angeles, Norwalk, Calif.; a $3,000,000 apartment house for Fresno, Calif.; 200 housing units for Larson Air Force Base and 250 homes for Air Force families at Fairchild Air Force Base near Spokane, Wash. All in all—a pretty good crop to start the year.

EW news roundup

STATICS—Producing cold without moving parts has been no secret for a considerable period of time. It is known as the Peltier effect and promises to be in commercial use for refrigerating applications in the not-too-distant future. It involves passing of current through the junction of two metals, producing the phenomenon of heat absorption at the junction.

Now General Electric has announced it can make electricity by the direct conversion of heat through a device with no moving parts. The new device is called a Thermionic converter and consists of two pieces of metal enclosed in a tube and separated by gas at low pressure. One piece of metal is heated to the point where electrons are emitted and the other is maintained at a lower temperature. Electron flow between the two elements provides an electric current at a present efficiency rate of about 8%. It's still a laboratory device—but it works.

Look, ma, heat and cold with no moving parts.

—EW—

DEADLINE HERE—The time to enter NEMA's 1957 Rural Home Electrical Load Building Contest is about over. Deadline for REA cooperatives is Jan. 10 and for commercial power companies Jan. 30.

—EW—

SIDELINE—A necessary avocation of American businessmen, regardless of their other skills, is accounting. As the Internal Revenue Service blithely goes from the ridiculous to the sublime in its effort to collect new income tax revenues, the businessman is forced to learn the art of bookkeeping.

Beginning next year, income tax returns will have to show how much a person has been reimbursed for business expenses. Internal Revenue wants to end the practice of some companies who supplement executive salaries with large amounts for expenses that are not incurred or deductible. With its usual "efficiency," the service has managed to dream up a system that goes clear down to the company messenger who has to pay 40¢ to take mail to the post office.

Even aside from the fact that the system will have questionable value as a revenue producer is the fact that it will force thousands of people to file Form 1040 who would otherwise be able to use the short form.

A reasonable question that a taxpayer might ask the Internal Revenue Service is: "What happens to the millions of dollars' worth of electronic accounting machinery you purchased to handle the short form returns?"

—EW—

STATISTIC OF THE WEEK—If all the electric transmission lines in the U. S. were wrapped on a giant reel and unwound off into space, they would reach out—240,000 miles, give or take a mile or so.

BRONZE PLAQUES, a new recognition for authors who contribute to the literature of the industry through Electrical West, are being distributed to technical writers in utility and other organizations throughout the 11 Western States. Shown are Gene Starr, chief engineer, Bonneville Power Administration, presenting the recognition plaques to Ralph S. Gens, Nobuo Sato and Edward H. Gehrig, all authors of recent articles in Electrical West

Machines are getting smarter than people. Next year a Chicago concern says it will market an automatic change machine that will convert a dollar bill into the equivalent amount of silver. The automatic cashier will accept a dollar bill, inspect it and either make the correct change or reject it if someone tries to fool it with a larger denomination, foreign money or phony currency.

—EW—

ELECTROMATION—"To say that American industry today is underpowered is an understatement. What good are all these dreams of electromation (automation) and increased output if the very energy that is going to make all this possible can't even get in the front door?" These are the words of A. C. Monteith, vice-president in charge of apparatus products for Westinghouse.

Talking before the annual meet-

When choosing a premium power cable . . .

How much choice do you <u>really</u> have?

Cable may *look* alike—but you can find many differences in jackets and insulating compounds. And you want only the *best* cable for your operating conditions.

That's why it's important to choose your cable from a manufacturer who offers you a real choice of modern cable materials.

Full choice of insulating compounds

Only three major companies give you a choice of *either* oil-base or butyl-base insulation. Rome Cable is one of these three and offers a choice of Rozone A (butyl-base) and Rozone (oil-base) insulations.

And, in addition, Rome can offer you a *polyethylene* insulation for high voltages.

You can match your operating needs more closely with cable insulation that puts the emphasis on what you want most—resistance to heat, moisture, ozone cutting, or any combination of properties. You can be sure of this choice when the cable is made by Rome Cable.

Getting the right jacket

In modern jacket materials, too, the same kind of freedom works to your advantage. You get a choice, with Rome Cable, of Roseal (special flame-retardant polyethylene); Roprene (a Rome-developed neoprene compound for use with rubber insulations); Rolene (polyethylene); and several other high-quality jacketing compounds. Each has its own advantages, depending on your requirements.

Bring your cable problems to Rome

When you discuss your premium cable requirements with your Rome Cable representative, you can count on his recommending the *right* cable for you. No matter what type of cable you choose, take advantage of Rome's ability to offer you a *real* choice.

For more information on the choice you get with Rome's power cable, contact him now—or write to Department 713, Rome Cable Corporation, Rome, New York.

ROME CABLE

CORPORATION

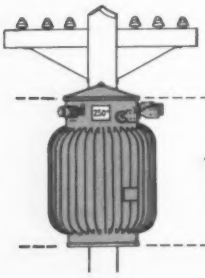
have your

Westinghouse representative

tell you how you can

SERVE BULK LOADS FROM THE POLE TOP

Now—a 250-kva transformer (1700 lbs) to serve a heavy, concentrated load from the pole top . . . another answer to changing needs from Westinghouse Plowback into distribution transformer development. J-70835



YOU CAN BE SURE...IF IT'S

Westinghouse

ing of the National Electrical Manufacturers' Assn. recently, Monteith told of a survey made of 550 important industrial plants which showed that the heavy majority had inadequate electrical equipment to handle the power loads that are needed in the next 10 years to meet the demands, predicted to be 40% above today's.

Monteith said American factories must boost the capacity of their electrical systems before they can automate operations enough to produce the flood of goods that will be demanded in the future by a rapidly growing population.

—EW—

The NSPE has recently taken a stand on the subject of engineering titles. Experience in such matters as labor cases, administrative rulings and the like shows repeated examples of the conferring of engineering titles on individuals or groups. By defining and standardizing engineering titles, much of this confusion will be avoided. Sounds good.

A unique gimmick developed by Clyde Walker of the community relations department of Portland General Electric Co. is a hand-cranked electric generator he uses to demonstrate some simple truths about his product to grade and high school students with whom he comes in contact in his 4-H, FFA and boys club work. The demonstratees can easily turn up 7 w or 15 w, but find 25 w a little more difficult. When they are told that if they keep cranking the 25-w load for 40 hours they will have generated one kilowatt-hour of electricity and saved about one cent, it makes a quite impressive point quickly and simply put across. Everett Pope, left, and Ed Shook use the device.

MAINTENANCE SHOW — EMEA of Southern California has announced plans for a conference to be held in connection with its 9th Biennial Electrical Industry Show in Shrine Exposition Hall, Los Angeles, March 27-29. Paul H. Henrichs, Southern California Edison Co., is conference chairman; Fred J. Tabery, exhibit manager. Exhibit information may be secured from Tabery at 3443 S. Hill St., Los Angeles.

—EW—

NATIONAL ELECTRICAL WEEK—Everywhere teams are hard at work getting ready to turn the spotlight of favorable publicity on the electrical industry during National Electrical Week Feb. 9-15. Special emphasis this year is being given to Science Youth Day on Edison's birthday Feb. 11. Radio and TV programs, public service spots, open houses at college and school laboratories and by electrical manufacturers and utilities are being featured.

—EW—

PROMOTION PAYS — While the trend has been downward nationally on major electric appliance sales, dealers in northern California report increases — some of them substantial — for the first nine months as compared with last year. These increases are on items which the Northern California Electrical Bureau has promoted aggressively within the report period.

Even where sales declined, as in television, the loss was less than experienced nationally and was reversed after a September promotion. The close relation of sales to promotion was emphasized in the case of the dryer, which showed substantial increases in 1956, when NCEB ran a spring campaign, fell off in 1957, without a spring drive, was picking up again in October following the fall campaign.

While differential in annual rate of population growth (3.4% in PG and E territory; 1.8% nationally) was favorable to the region, differential in sales volume was much greater. Here are some of the figures:

	NCEB Area 9 months 1957 vs 1956	National * 8 months 1957 vs 1956	Combined Differential
Freezers	11.6% increase	7.7% decrease	19.3%
Refrigerator-freezers	0.2% increase	3.7% decrease	3.9%
Ranges	9.5% increase	12.8% decrease	22.3%
Water heaters	8.2% increase	27.9% decrease	36.1%
Bed coverings	57.0% increase	Not available	

** NEMA reports of distributors sales to dealers (latest available)*

Get Off the Worry-Go-Round

"EVERY TIME HE CALLS ON AN IMPORTANT PROSPECT HE GETS THE JITTERS. HE STANDS THERE WONDERING: "WHAT WILL HE THINK OF ME? WILL I MAKE A GOOD IMPRESSION? NO WONDER HIS SALES RECORD IS POOR."
OLIVER JENKS PRESIDENT
HI TENSION

It Happens to the Best of 'Em

Every successful salesman has had moments like this. In fact, research organizations say that 40% of all businessmen admit that lack of self-confidence is one of their chief fears.

Most top-notch actors suffer that butterfly - in - the - stomach feeling. But they recognize it for what it is: a natural nervousness that often disappears the moment they get on the stage.

The next time you get an attack of the jitters remind yourself that it's a natural way to feel, concentrate on the message you want to give and remember that your prospect is just another human being like you. And like you, he's got his own worries.

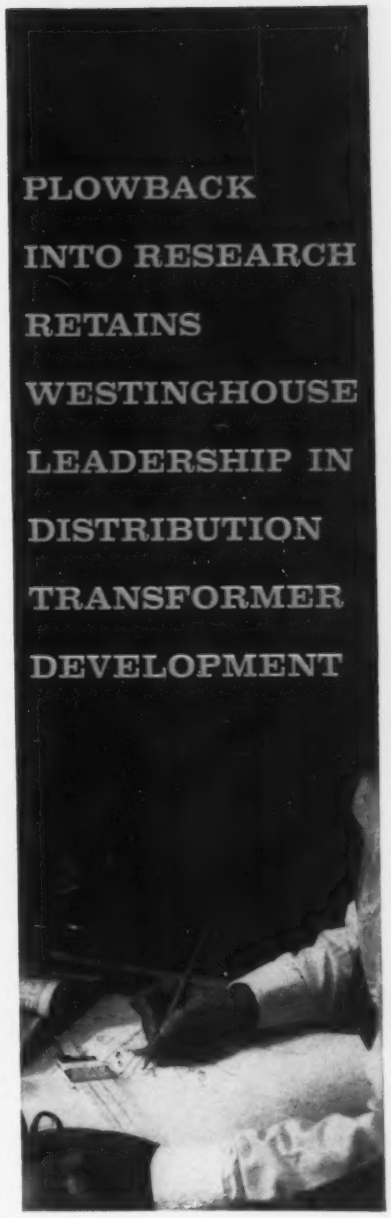
Expect to have a pleasant interview. You will.

The Seattle City Light Building, which is currently being remodeled and enlarged, will have on the front of the building a glass mosaic mural 9 ft high and 33 ft long. Mrs. Wellwood Beall, a Seattle artist, will make the mural in Mexico. Figures and symbols will represent the sun, moon, wind and rain harnessed by man and converted into electric power.

—EW—

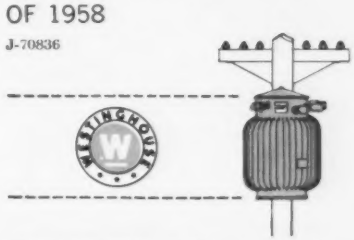
WINNERS — As you are reading this, 45 farm boys and girls from across the nation will be attending the 36th National 4-H Club Congress in Chicago thanks to the Westinghouse Educational Foundation.

The institution gives expense-paid trips to the 4-H Club Congress to



WATCH THESE PAGES
FOR THE BIGGEST NEWS
OF 1958

J-70836



YOU CAN BE SURE...IF IT'S
Westinghouse

NEW
FAST-APPROACH
HYDRAULIC PUMP
For conduit benders
two-speed action
saves time, money

GREENLEE No. 798-SA

The new GREENLEE No. 798-AC Hydraulic Power Pump operates GREENLEE Conduit and Pipe Benders *three to five times faster* than a hand pump. (Teams with other conduit benders, too.) Exclusive GREENLEE fast approach, with automatic change-over to lower speed high-pressure drive, eliminates costly waiting time, makes jobs go faster and easier. Electric motor-driven pump develops 6,000 psi continuous pressure, up to 10,000 psi intermittent. Also speeds work with knockout punch drivers and other hydraulic tools.

GREENLEE *Send coupon*

GREENLEE TOOL CO.
1761 Columbia Ave.
Rockford, Illinois

Please send illustrated Bulletin E-223 on Greenlee No. 798-SA Portable Hydraulic Power Pumps.

NAME _____

COMPANY _____

ADDRESS _____

CITY AND STATE _____

girls and boys who have excelled in electrical projects to improve their homes or farms. In addition, the foundation also awards $400 scholarships to six of the group who are chosen as national winners.

The 36 years of the existence of the Congress has seen the number of participants grow from 2,000 to more than 900,000.

—EW—

J. W. "Wes" McAfee, president of Union Electric Co., assumes presidency of EEI with the resignation of Don Kennedy, president of Oklahoma Gas & Electric, who has headed EEI since June 1956. Montana Power's President J. E. Corette Jr. becomes EEI vice-president.

—EW—

CUT DRUDGERY—Electric dryers, according to the Household Equipment Research staff of Ohio State University, saves the housewife 20 8-hour days of work each year, that's three hours per week.

They also found that it takes 28 times as long to hang out an 8-lb load of clothes as it does to put them into an electric dryer. And it takes 10 times the energy to hang clothes as to dry them electrically; 625 steps are required to hang the 8-lb load of clothes as compared to three for the dryer.

—EW—

SEED STOCK—The average engineering teacher in American colleges and universities earns a salary of $6,634 per year—$550 per month. He adds consulting and other engineering work to bring the total earning to $8,862. He earns more in a private institution than in a public institution, and he earns more on the Pacific Coast than anywhere else in the nation. The survey found young engineering instructors' salaries ranging from an average of $4,214 in public institutions to $4,374 in privately supported schools. Deans earned $10,932 and $11,829, respectively.

Isn't it a wonder that so many truly fine educators have stuck with the profession? Isn't it also time that something was done to set this right?

—EW—

GRANT—The Atomic Energy Commission will provide $6,000,000 to aid in the construction of a 66,000-kw atomic power station to be built by Northern States Power in association with 10 other companies. AEC will also waive fuel use charges up to a million dollars during the first five years of operation.

Probable location of the plant is in South Dakota and the reactor will be constructed under Allis-Chalmers supervision as the principal subcontractor. Total cost of the plant is estimated to be about $28,000,000.

—EW—

First U.S. full-scale reactor went critical during the early part of November. The Duquesne Light-Westinghouse 60,000-kw Shippingport station may be in commercial power production by the end of the year, 3 1/3 years after the ground-breaking ceremony at the site 25 miles northwest of Pittsburgh. Total cost of the plant is estimated to be at $110,000,000, more than 10 times the installed cost of conventional thermal stations.

—EW—

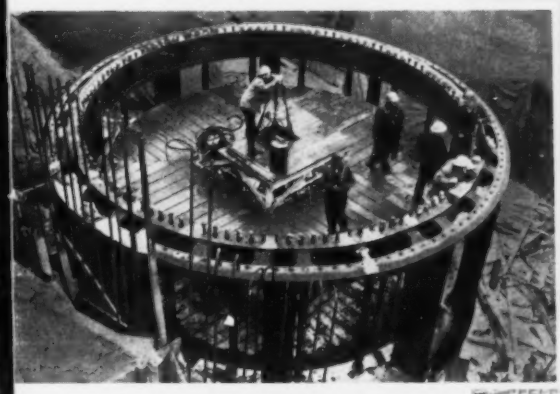
BONUS—Priest Rapids Dam on the Columbia River is a year and a half ahead of schedule with the prospect of earning for its contractor, Merritt, Chapman & Scott Corp., a bonus of between four and five million dollars on the $92,000,000 contract.

The Grant County PUD would be able to sell approximately $15,000,000 worth of additional power if the project goes on the line in the fall of 1959 as it now appears probable.

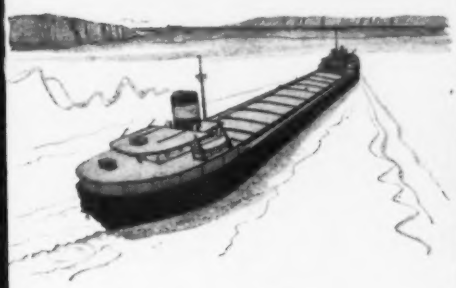
—EW—

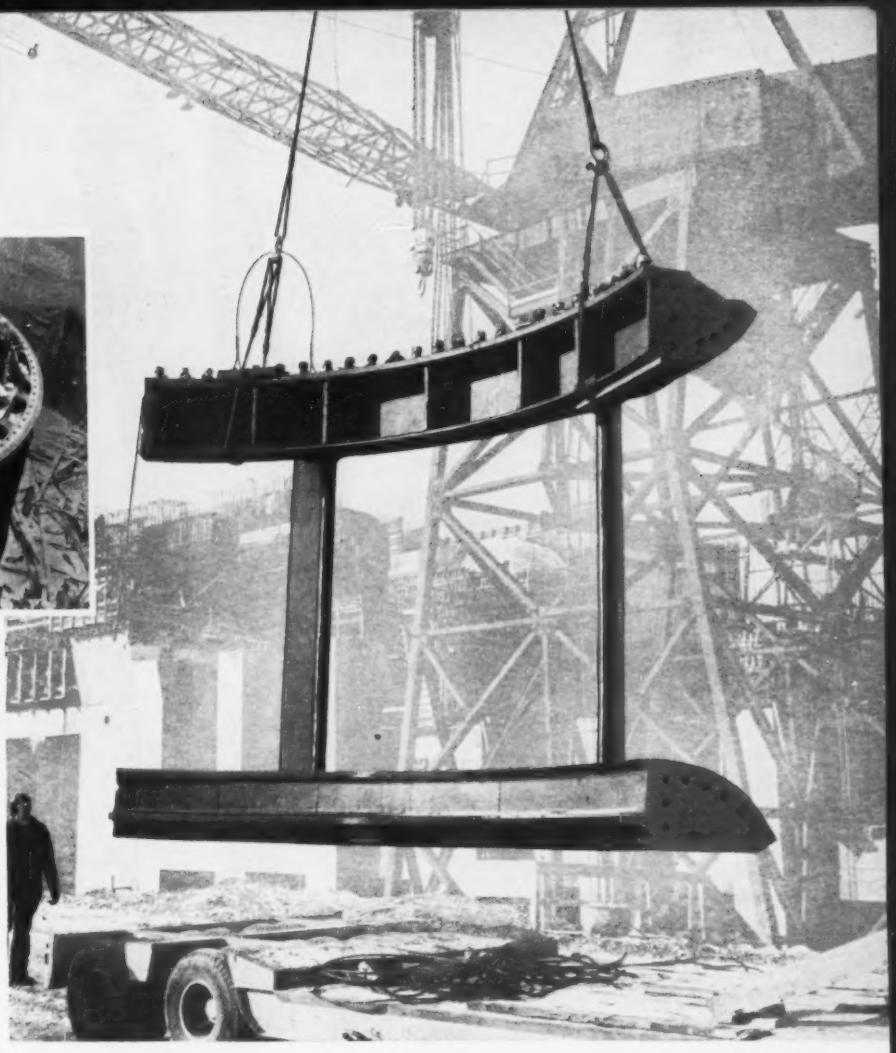
TERAWATT-HOURS—Things are getting so large that it requires ingenuity to coin new terms to describe them. In case you should run across the term "terawatt-hours" it is

(Right) Stay ring section of Allis-Chalmers turbine being lifted into place during field assembly at Barnhart Island powerhouse site. (Below) Completed stay ring assembly being leveled. The whole project will consist of 16 turbine units on the American side and 16 on the Canadian side.



Photos courtesy of Power Authority of the State of New York, Uhl, Hall and Rich, Engineers.





St. Lawrence Power . . . Near Reality

A-C turbines to tap river . . . boost industrial expansion

IN goes another Allis-Chalmers hydraulic turbine to help harness the waters of the mighty St. Lawrence River.

The breath-taking St. Lawrence power and seaway project, realizing a 50-year dream of two great nations, will soon amplify shipping lanes to the Great Lakes and provide an additional two million kw of much needed power.

The Barnhart Island powerhouse will include eight Allis-Chalmers hydraulic turbines and cabinet-type governors for all units on the United States side of the river.

Each of the A-C fixed-blade propeller-type turbines will develop 85,000 hp. Their cast steel runners are 20 feet in diameter; forged steel main shafts are over 3 feet in diameter.

World-recognized shop facilities and unsurpassed engineering experience in designing and building large hydroelectric units are reasons why Allis-Chalmers can be selected with confidence. The engineering experience connected with over 16 million installed hydraulic turbine horsepower can be yours. Call the Allis-Chalmers representative near you, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

A-5420

BUY

ALL TRIANGLE PRODUCTS LOCALLY FROM YOUR ELECTRICAL DISTRIBUTOR

It's smart today to buy all your electrical needs — wire, conduit, cable, switches, fittings — from your nearby distributor. One call shopping saves you time and money.

Your distributor's warehousing saves you countless cubic feet of valuable floor space, and assures you of a constant flow of fresh materials as your schedules demand.

Your distributor gives you

Fast delivery . . . on one item or a hundred—from one manufacturer, or from many.

Simplified bookkeeping . . . one invoice, one statement, one account.

Low inventory cost . . . his stock is your inventory control, gives you working capital.

Lower insurance rates . . . less inventory means your flood, fire rates are lessened.

That's why dependable electrical manufacturers advise you to always buy from YOUR DISTRIBUTOR — THE BEST FRIEND YOUR BUSINESS CAN HAVE! He's the one source for everything electrical — and he's local.

Your Distributor— The Best Friend Your Business Can Have!
TRIANGLE CONDUIT & CABLE CO., INC.
New Brunswick, N. J.
TRIANGLE
"It MUST Be Right!"

merely ten to the sixth power (10^6) megawatt-hours and used in a recent paper that analyzed the world's power demand. For example, in 1950 the world was estimated to have used 30,000 terawatt-hours and it is predicted that that number will rise to 100,000 by the year 2000.

For all of us who have trouble with elementary math, 100,000 twh equals 100,000,000,000,000 kwh. In other words, quite a few.

—EW—

It was with great sorrow that the electrical industry learned of the sudden death of Charles L. Smith, secretary-treasurer of the International Association of Electrical Inspectors in November. In a way, his monument is the National Electrical Code, for few people have devoted more effort to have it accepted as a standard by inspection authorities in cities, states and other government bodies.

—EW—

ENGINEERS' WEEK—National Engineers' Week chairman, John L. Bahr, recently announced the names of 14 individual sponsors. National Engineers' Week, under the general sponsorship of the NSPE, heads the sponsors' list with James R. Killian Jr., DuMont's Dumont, GM's Kettering, G-E's Linder, Navy's Rickover, CIT's Sorensen and a continuing list of Who's Who in engineering.

This year, more than ever before, this activity has a real chance to score in the eyes of the American people.

—EW—

CLEVER — California Electric Works, San Diego, always a consistent advertiser and promoter of its many facets of electrical service, has recently issued a new brochure telling and picturing the various services offered to the public.

It has also tied in to the national Housepower program on NBC Monitor by sponsoring spot announcements through October and November.

Most interesting are a series of gadget mailings to a wide list of customers and prospects. First was on Uskon heating in which small samples are used. Others are to follow on lamp bulb filaments for lighting, piece of wire for wiring, a three-wire cord for grounding, a piece of insulation paper used in

motor rewinding and a carbon brush used in motors. Experience has proved these attention getters, also bring customers.

—EW—

"There is nothing wrong with the copper market that a cut in production would not cure." So stated Dr. Joseph Zimmerman, editor-in-chief of the Daily Metal Reporter. "As to whether the copper market has turned the corner, in view of the fact that in the past 16 months the price has dropped more than 50%, from 55c a pound to about 26c a pound, the market is nearer the corner now than it has been. An adjustment in the supply position is all that is needed to push it definitely around the corner." Stock up?

—EW—

SELL OUT—Chelan County Public Utility District (Wash.) announced that the power from its proposed Rocky Reach Dam on the Columbia River has all been allocated.

Nearly three-quarters of the plant's output will go to the Puget Sound Power & Light Co. and the Aluminum Co. of America. The balance, with deductions for the PUD itself, will be shared by Pacific Power & Light, Portland General Electric and the Washington Water Power Co.

Firming up the power-sharing contracts will enable the financing of the $270,000,000 project.

—EW—

PROGRAM CLICKING—A feature of the 1958 Live Better . . . *Electrically* program will be the Medallion Home award promotion, designed to increase the sales of homes that feature basic major electric appliances, light for living and full Housepower.

In southern California eight utilities have joined together to produce the first set of unified requirements for Medallion Homes.

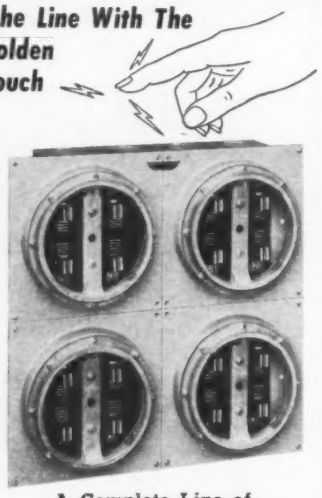
In Mesa, Ariz., Salt River Power District sponsored the first U. S. tract of 85 Gold Medallion all-electric homes. Woodburn & Sons Construction Co. was the builder.

—EW—

In this age of planning for trips to the moon and Mars, anything is worth believing. Aluminum Co. of America, gaz-

POWER
SYSTEM TREND IS
TOWARD INTERLOCKED
ARMOR CABLE
Where the ruggedness of rigid conduit is not essential, more and more Utility and Industrial Engineers are turning to Interlocked Armor Cable for power distribution circuits. This new cable can be installed at a much lower first and final cost than conventional systems, both in new circuits and in modernizing existing circuits.
Easier, Faster to Install—Bends easily around corners and obstructions. Simplifies layout—long runs can be installed without splices or pull boxes.
Easier to Tap, Replace, or Relocate—Laid in racks or on hangers, the cable is accessible all along the line.
Smaller Space Requirements—Normally requires about half as much space as cable and conduit.
Choice of Types—Triangle Interlocked Armor Cables are available with a choice of 3 insulations, 3 armors—to match the requirements of the job.
TRIANGLE CONDUIT & CABLE CO., INC.
New Brunswick, New Jersey
Write for Bulletin IA-10 giving product and installation information and design data.
Buy Smart — Buy from Your Distributor
TRIANGLE
"It MUST Be Right!"

The Line With The Golden Touch



A Complete Line of Residential Meter Troughs

BLAKEMAN ELECTRIC BB BROTHERS MFG. CO. INC. LOS ANGELES CALIFORNIA

5859 Compton Ave. Los Angeles 1, Calif.
LUdlow 1-8231
CONTACT YOUR JOBBER
METER MOUNTING DEVICES ● THAT'S ALL

You get a lot to like in

BURNDY

HYLUGS

— faster *— foolproof* *— flip-top box*

Wire, Hylug and stud sizes clearly marked on every box. Separate color-coded boxes for Hylugs and Hylinks. Available in flip-top boxes through #8.

GEO. E. HONN CO.
420 Market St. San Francisco 11, Cal.
PHONE SU 1-7352

ing into their aluminum Sputnik, sees these intriguing things: a room-size rug of woven aluminum that provides radiant heat for electrical comfort and aluminum foil wallpaper; somewhat further ahead lies a rug that "cools" for year 'round air conditioning.

AWARD — The Babcock & Wilcox Co. has received a bronze "Oscar of Industry" for having the best annual report issued by firms in the industrial equipment field. This is the second consecutive year the firm has earned the honor. More than 5,000 reports were entered in this year's competition.

As a Manager—

HOW WOULD YOU ANSWER?

Success in administration has been demonstrated to require certain skills and attitudes. This is the first of a series of self-tests which will appear in Electrical West during 1958.

Test yourself against these by answering the following true or false questions. The answers, typical of some experienced managers, as well as a discussion of the questions, will be found on page 84.

	True	False
1. It is better for management to set complete formal executive development programs for junior executives than it is to expect department heads to carry out the grooming of future executives in addition to building an efficient departmental organization.....	.....	.....
2. I should accept decisions made by my subordinates and let them go ahead on their own even though the end results probably will be less advantageous for my department and less beneficial for the company.	.....	.....
3. There just isn't time to read and learn everything. I will get ahead faster if I specialize and become expert in the things I know best.	.....	.....
4. Managers are frequently called upon to make on-the-spot decisions. In spite of that, I should delay action long enough to get all of the facts which are important and pertinent to decision making.	.....	.....
5. I feel that I can size up candidates for positions in personnel interviews more accurately than I can assess their value from test reports submitted by industrial psychologists.	.....	.....
6. Management keeps telling us that we should build teams but if I try to be cooperative or do favors for other department heads, I immediately feel that they start taking advantage of my good nature.	.....	.....
7. I am the kind of man who would rather stick my neck out to carry out what looks like a good new idea but which might fail, than to follow past precedents and proven traditional procedures.	.....	.....
8. I can do myself more good by being known as a good community representative than by being known as an efficient operating manager.	.....	.....
9. It is more important to do my job correctly than it is to get involved in promoting personal relations within the company.	.....	.....
10. Superior technical competence should be the important factor in selecting a man for a technical supervisory position.	.....	.....

NEVER BEFORE A PLASTIC TAPE LIKE THIS →

GET TOTAL

new SLIPKNOT #7 ...inseparable fusion

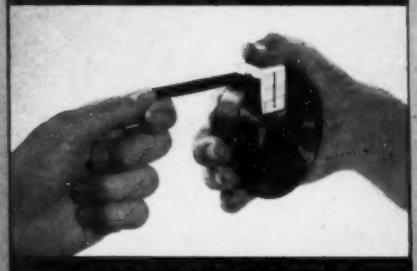
TAPES BY
SOLD ONLY THRU RECOGNIZED WHOLESALERS
PLYMOUTH RUBBER COMPANY, INC.

A COST-CUTTER PACKED IN EVERY CAN!

QUICK, CLEAN CUTS WITH THE NEW SLIPKNOT PLASTIC CUTTER

NOW . . . a new, exclusive, (pat. pending) tape cutter, developed by Plymouth for sure, easy cutting, is packed FREE* in every 66-ft. can . . . to cut without waste, even in the tightest spots! Plastic, non-conducting.

NO MORE OF THIS!



NOW – CUT CLEAN, QUICKLY!

ALWAYS HANDY – PACKS IN CORE!

*Limited time offer

ADHESION

PLASTIC TAPE with ZF-90* for permanent protection

AT LAST . . . a vinyl electrical tape you *know* you can depend on! New SLIPKNOT #7 is superior to any plastic tape you've ever known!

ZF-90* *inseparably fuses* special adhesive to vinyl base; they *cannot come apart*, and therefore *will not dry out. This* is *total adhesion*, making splicing easier, swifter, surer than ever before!

Thus Plymouth creative research has developed a plastic tape that will, with only moderate tension, pull down tightly and hold permanently on *every* job, without creeping or thinning, untroubled by field conditions under which ordinary plastic tapes often fail.

New SLIPKNOT #7 has a wider temperature working range, too, than other plastic tapes. ZF-90* makes the difference. This new tape has successfully passed the most rugged laboratory and field tests ever devised. It will pass all of yours, too.

New SLIPKNOT #7 is tough — abrasion-resistant, yet resilient and easy to handle, *molding totally* around any job. It *permanently* resists the attack of water, acids, alkalies, oils and corrosion. And just *one* .007″ layer has a dielectric strength of 10,000 volts!

Why settle for partial protection when you can get *total adhesion* with new SLIPKNOT #7 PLASTIC ELECTRICAL TAPE? Don't wait another day to try it. It's at your distributor's now.

*Plymouth's formula for total adhesion

Temperature, 94°. Humidity, 99%. Electrical conditions — just about the worst in the world! New Slipknot Plastic Tape went to the offshore oil fields of Dutch Guiana — and it's still there, on the job through salt, heat and wet that never let up!

Years of punishment ahead! New slipknot Plastic Tape splices the original wiring in the 'tween-decks of an ocean-going tanker, where salt water and oil will do their worst work! New Slipknot proves its worth on **all** jobs!

How dry and gritty can you get? New Slipknot Plastic Tape goes to work in the high desert country, where the winds blow constantly! (In wider form, wraps pipelines — its anti-corrosion and abrasion-resistant properties are excellent!)

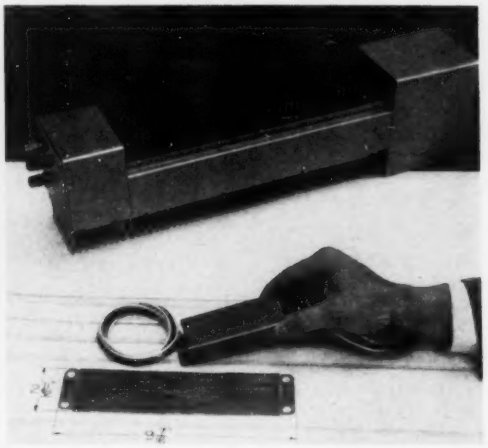
PLYMOUTH RUBBER COMPANY, INC.

Makers of SLIPKNOT FRICTION TAPE

DIVISION 14 **CANTON, MASSACHUSETTS**

PRODUCT NEWS

New Designs and Applications



Lighting Power Source

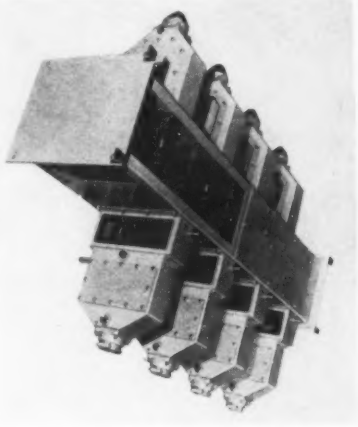
(1) *Westinghouse Electric Corp., Lighting Division, Edgewater Park, Cleveland, Ohio.*

Development of the first transistorized high frequency power sources for lighting systems has been announced by this company. As it is incorporated in standard lighting equipment in coming months, it is expected to eliminate major technical and economic obstacles now inhibiting indoor and outdoor use of high frequency lighting. Prototypes now operating supply power at 1,500 cycles to 64 standard 40-w rapid-start fluorescent lamps. Power packages used in the pilot installation measure 5x4x19½ in., weigh 11 lb and deliver up to 1½ kw at 150 v, peak. Others have been built in ratings of 3 kva. At 1,500 cycles, power conversion efficiency is in the order of 94% at rated load and 92% at half load. Ballasts weigh only a few ounces and are about the size of a king-size pack of cigarettes. Ballast losses are about 25% of losses of the best 60-cycle ballasts for the same lamps.

Control Calibrator

(2) *Micro Balancing Inc., Garden City Park, L. I., N. Y.*

Accurate, two-minute calibration and circuit checking of any photoelectric street light control is said to be possible with this new light control calibrator. Down time and delays are reduced by eliminating the need for returning light control units to the manufacturer for adjustment, according to the manufacturer. Daylight at dawn or dusk is simulated by a constant color temperature light, corrected with filters, and with a range of 0 to 5½ f-c.



Bus-Disconnect

(3) *Electrical Engineers Equipment Co., Melrose Park, Ill.*

This company has designed a combination of its disconnect Isolator and bus duct. Called Iso-Duct, the new product is arranged for future extension in either direction. Any number of Isolator and pothead combinations can be interchanged when rearranging is necessary.

Aluminum Conductor

(4) *Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.*

Minimum conductivity of 62% but without reduction in tensile strength is claimed for new conductor available from this company at no extra cost. The company says the one-percentage-point increase will enable engineers in many instances to assign a present worth cost saving of as much as 2¢ per pound of conductor in transmission losses.

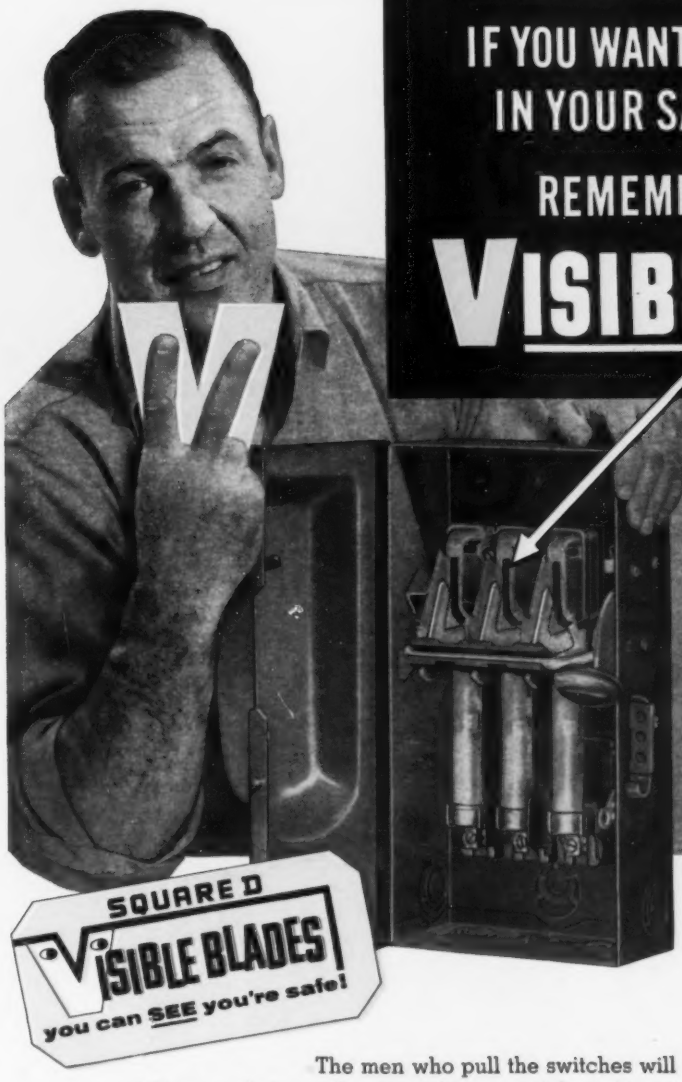
Transformer Mounting

(5) *Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee 1, Wis.*

Mounting arrangements for its wound primary outdoor current transformer (type KO) has been redesigned by this manufacturer. The squared-up base is now drilled to accommodate L brackets that can be bolted to the base in a variety of positions. The transformer can be installed either 90° or 180° from the mounting position.

Use Coupon for More Information . . . **. . . See Page 28**

IF YOU WANT COMPLETE SAFETY IN YOUR SAFETY SWITCHES— REMEMBER THE "V" FOR VISIBLE BLADES!



The men who pull the switches will tell you what can happen when a switch, *believed* to be open—*isn't.* A lot of things can happen—and every one of them is bad. Personnel safety is in jeopardy. Motors can single-phase. Machinery and work can be damaged. Down-time can skyrocket.

Doesn't it make sense to insist on Visible Blade construction which gives you a road block against any of those possibilities? Doesn't it make equally good sense to insist on the safety switch which gives you that construction—plus a lot of other performance advantages?

HERE IS ANOTHER REASON WHY SQUARE D HAS HELD FIRST PLACE FOR MORE THAN 50 YEARS

Positive Pressure (SPRING LOADED) Fuse Clips

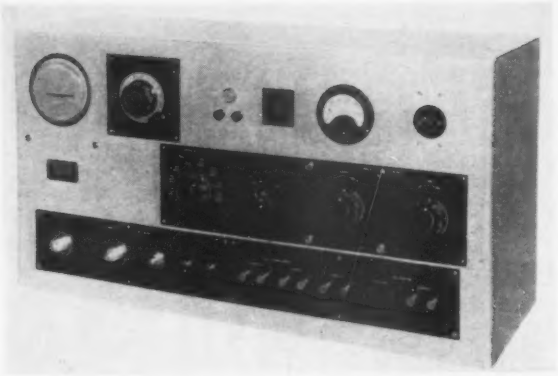
✓ Maintain positive contact as fuses alternately heat and cool. Fuses are held tight even where vibration is present or during short circuit surges.

✓ Fuse clip jaws use pure copper for current-carrying parts and spring steel for pressure. They reduce heating 80% over commercial type clip.

✓ No clamps or screws to tighten—or to forget to tighten.

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY



Transformer Tester

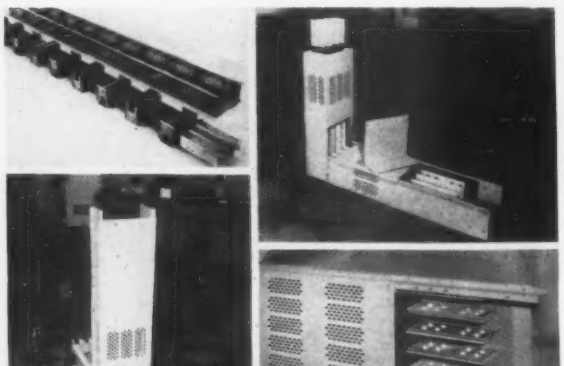
(6) *Knopp Inc., 1307 66th St., Oakland, Calif.*

Called Uniload Current Transformer Testing Equipment, this new product is designed for the calibration of current transformers of 20 different ratings ranging from 5 to 1,500 amp. Standard of comparison included is the Knopp Precision Multirange Current Transformer. Two necessary auxiliary instruments are an ammeter and a low capacity zero-center wattmeter.

Aluminum Conductor

(7) *Reynolds Metals Co., 2500 S. Third St., Louisville, Ky.*

A new all-aluminum conductor that is said to be high strength and low cost is available from this company. The new cable is lighter in weight than ACSR and stronger than EC cable, the manufacturer reports. Cost per 1,000 ft is reported to be no more than that of electrically equivalent sizes of 6/1 ACSR.



Bus Ducts

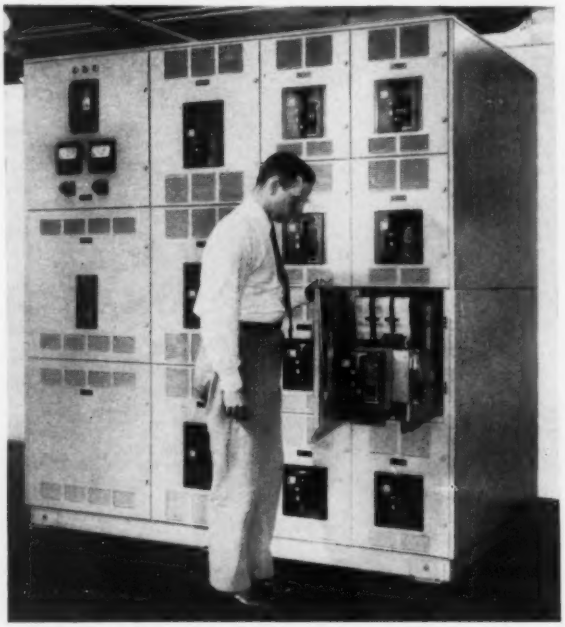
(8) *Federal Pacific Electric Co., 888 N. Keyser Ave., Scranton, Pa.*

Improved design low impedance feeder and plug-in bus ducts supplied with totally enclosed, ventilated or weatherproof housings have been announced by this company. Design of the new bus ducts permits assembly of tees and elbows during installation to meet particular user needs. Self-supporting bus bars are secured in place on 11-in. centers by means of bolted phenolic blocks. Bus bars are arranged with integral plug-nuts at one end and slotted holes at the other to save time and simplify alignment and bolting. Heavy current take-off devices can be bolted on bus at any time without disturbing splice between installed sections.

Interlocked Armored Cable

(9) *Rome Cable Corp., Rome, N. Y.*

Interlocked armored cable with 600-, 5,000- and 15,000-v ratings, which may be used in place of cable-in-conduit, is now available with almost any number of conductors with oil-base, butyl-base and other insulations from this company. Designed for use in power feeder systems in electrical substations and industrial plants. Metallic armor is either galvanized steel, aluminum or bronze.

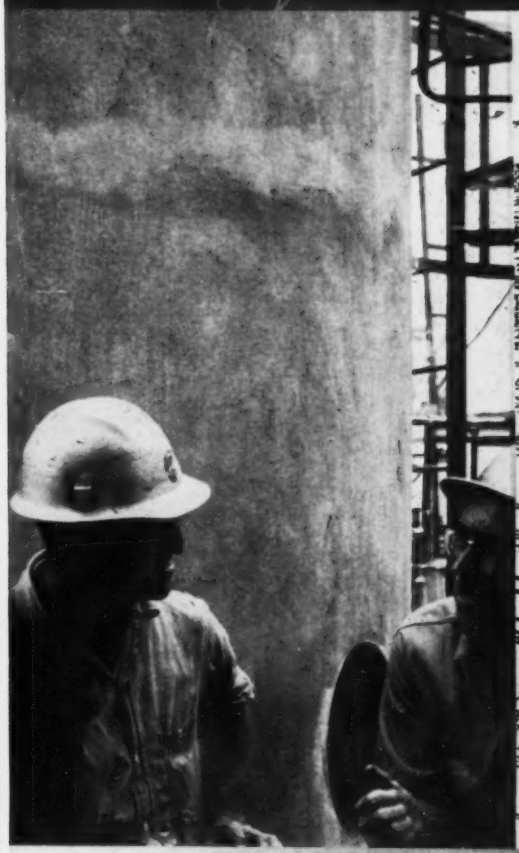


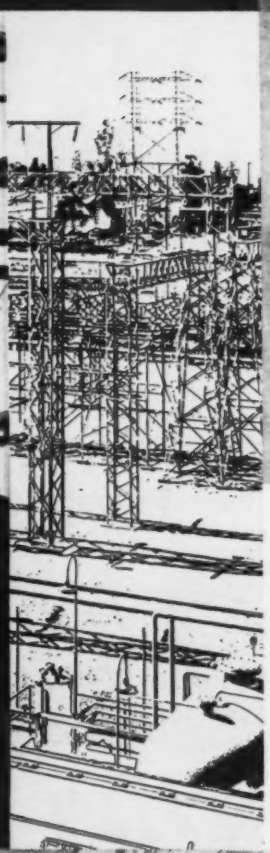
Switchgear-Circuit Breakers

(10) *I-T-E Circuit Breaker Co., Switchgear Division, 19th & Hamilton Sts., Philadelphia, Pa.*

Several "firsts" are claimed in the redesign of this company's low-voltage power circuit breakers and of the switchgear that makes use of them. The equipment has: quick-make manual enclosure; closed-door drawout operation; subassembly breaker construction for easier, faster parts replacement; four-high stacking of 600-amp frame size; new semiflush pulldown handle; stored energy electrical enclosure that cuts secondary circuit requirements; and increased accessibility for operation and servicing.

For More Information Use Coupon . . . Page 28

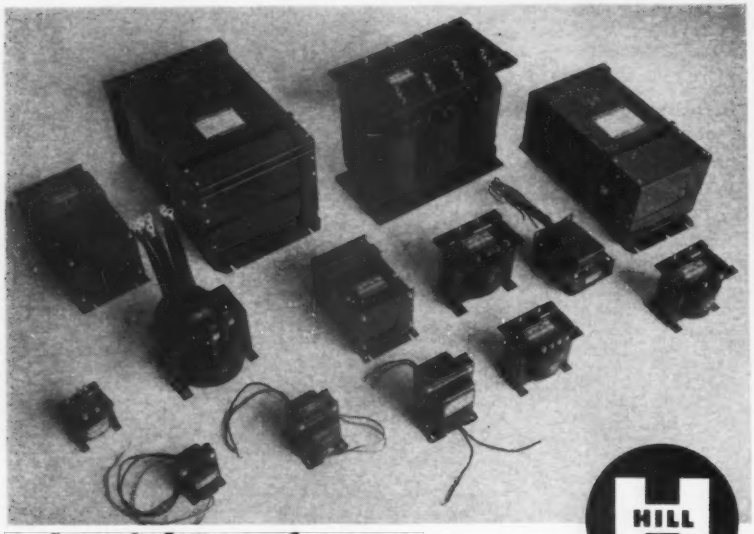




WHEN you consider expansion...
...the most important
investment you can make is in
the creative ability of men.

FLUOR

The Fluor Corporation, Ltd.
Engineers & Constructors
2500 S. Atlantic Blvd., Los Angeles



Industrial Transformers For Every Application

Hill Transformer Co., Inc. is a quick, reliable source of industrial transformers of highest quality—Wide variety of design; long or short production runs; designed to meet your special requirements.

Power and distribution transformers—Oil Filled, Askarel, Dry Types—available through 5000 KVA. All manufactured to NEMA and ASA standards.

Hill Transformer Co., Inc. 1030 Washington Street San Carlos • California

Reach For Test-Proven

ACCURATE TAPE

FRICTION .... RUBBER .... PLASTIC

Test-proven by International Testing Laboratories, Inc., for bond and tensile strength, climatic extremes, dielectric qualities, and elongation tests. Accurate exceeded all ASTM requirements. Rely on Accurate with confidence—Accurate is the choice of electrical men everywhere. Accurate Plastic Tape is Underwriters' Laboratories approved.

Send today for our most recent bulletin describing details.

ACCURATE MANUFACTURING CO.
GARFIELD, NEW JERSEY

Power Factor Unit

(11) *Sangamo Electric Co., Springfield, Ill.*

This company announces a new preassembled secondary power factor correction unit that can be installed easily at the service entrance without wiring changes. The unit combines a power capacitor with a socket meter mounting adapter in one metal enclosure. A fuse in each lead provides protection in event of either line or ground faults. Available in 1.5- and 2-kvar sizes.

Radio Test Set

(12) *Motorola Communications & Electronics Inc., Dept. PTS, 4501 Augusta Blvd., Chicago 51, Ill.*

Simplicity of use is a feature of a multipurpose portable test set for two-way radio servicing recently announced by this company. Features are: transistorized electronic a-c voltmeter; 4-in. 2% meter; function-grouped controls and calibrated meter scales. It serves as voltmeter, milliammeter, RF power output indicator, relative field strength meter, signal generator and crystal checker.

Substation Luminaire

(13) *Holophane Co. Inc., 342 Madison Ave., New York 17, N. Y.*

This new luminaire for outdoor substation lighting has as a light controlling element a one-piece prismatic refractor made of thermally stable glass. A bottom reflector and top cover, both of spun aluminum, together with a threaded collar and fitter of cast aluminum, complete the unit. Accommodates 400-w or 250-w mercury vapor lamps or 500-w and 300-w incandescent lamps. Fitter is arranged to slip-fit over 1½ in. pipe.

No. 1 in a series

Right off the Wire

An all-electronic telephone exchange (said to be the first for commercial use) has no moving parts, is noiseless and can be used in explosive atmospheres. It includes a "memory" which will hold an incoming call.

Wire can be strung beside a railroad track by a new travelling crane at the rate of 60,000 feet per hour.

Simplex recently completed one of the largest and heaviest shipments of cable ever transported on one reel — nearly two miles of ANHYDREX XX insulated submarine cable weighing 60 tons.

A new rubber-like material is porous, but will contain liquids.

Boron, lithium, hydrogen peroxide and fluorine compounds are to be the fuels of a new bomber reported to be in the design stage.

Smog-causing chemicals from automobile exhausts can be eliminated by a chemical catalyst developed by an automobile manufacturer.

Improvements in the explosive rivet have made it noiseless.

Only the touch of a hand is needed to light a new lamp. The electricity in the hand does the work.

Thorium is about three times as plentiful as uranium. A new process for the production of reactor-grade thorium should lead to a reduction in the cost of atomic fuel.

A high-output ultraviolet lamp, for heating and air-conditioning ducts, is claimed to be 1,000 times more effective in killing viruses and bacteria than an equal amount of radiation from the sun.

The world's largest solar furnace is to be completed in 1959. It will produce temperatures as high as 8,000°F, which is about 70% of the temperature of the sun's surface.

An ultra-hard glass has been developed that retains its hardness up to 1508°F.

The cost of converting sea water to fresh water has been reduced from $1.50 to 60 cents per thousand gallons.

"Talk-back TV", a new advance in educational television, enables a pupil to ask questions of a teacher who is broadcasting from a distant room.

Scientists have been able to produce shock waves with speeds of more than 100,000 mph (above Mach 150) involving temperatures higher than 100,000°F.

Some 1958 automobiles are using aluminum instead of copper in battery cables.

The first deep sea telephone cables to utilize the revolutionary new Bell Laboratory vacuum tube repeaters were manufactured by Simplex. Minimum tube life is expected to be 20 years.

Danish trawlers are using nylon propellers. The four-foot, three-bladed size weighs only seventeen pounds and they reduce vibration, resist impact damage and corrosion.

A cell that generates electricity by the chemical action of oxygen and hydrogen has been announced. It avoids some of the disadvantages of both dry cells and storage batteries.

An airplane has been built which can change its shape while in flight for the purpose of testing aerodynamic configurations.

C-L-X (Sealex) is the name of a new, completely sealed, corrugated metallic cable sheath manufactured by Simplex. It is pliable, moistureproof, and permits cable engineers to select the most economical cable cores, while assuring the greatest mechanical protection available.

Observations of the aurora during the Geophysical Year show that it occurs simultaneously at both the North and South Poles. This definitely identifies it with the earth's magnetic field.

A miniature battery about the size of a paper clip is said to deliver a steady flow of current for 176,000 hours.

Shirtsleeve Service

Simplex recently completed an order for 4600 ft. of Anhydrex XX Parkway Cable. The Simplex man was on the spot to help with installation, which happened to be on a 9,500 ft. mountain in rough terrain. He helped design a reel mounting bracket (for holding up to 7200 lbs.) for the front of the tractor used for laying. He supervised the laying of two lengths 2200 feet long.

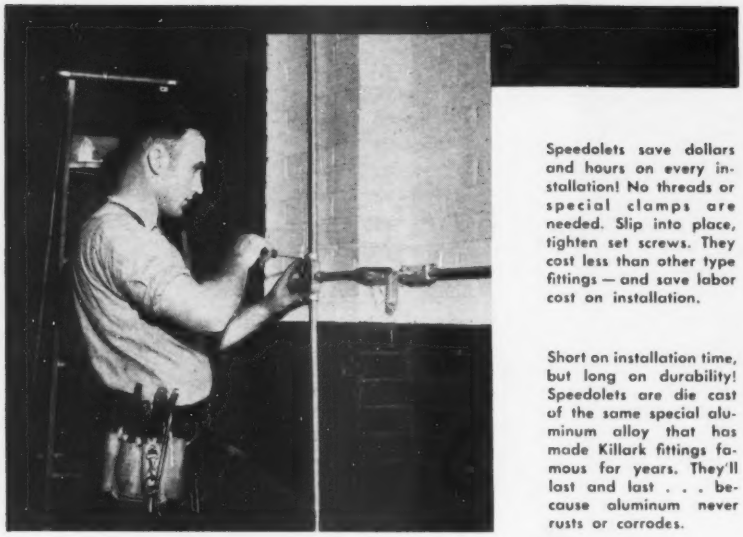
This case typifies the kind of cooperation that Simplex offers in order to assure correct installation and satisfactory service.

SIMPLEX WIRE & CABLE CO.
Cambridge, Massachusetts and
Newington, New Hampshire

Simplex

Highest quality cables for: Mining
Power & Lighting • Construction
Transportation • Communications
Signalling

See us at Booth 1124 Plant Maintenance & Engineering Show, Chicago



Speedolets save dollars and hours on every installation! No threads or special clamps are needed. Slip into place, tighten set screws. They cost less than other type fittings — and save labor cost on installation.

Short on installation time, but long on durability! Speedolets are die cast of the same special aluminum alloy that has made Killark fittings famous for years. They'll last and last . . . because aluminum never rusts or corrodes.

the "Man on the Ladder" selects...

KILLARK SPEEDOLET FITTINGS

For Thin-Wall Conduit

"I'm sold on KILLARK'S new line of Speedolets . . . they make the fastest, neatest installations I've ever seen."

"Now I can go up the ladder with no more than a screwdriver in my hands. All I have to do is slip the fitting over the thinwall conduit, tighten a set screw — the job's finished! No wrench to use, no small parts to handle.

See Your Killark Representative:

ELECTROLET KILLARK SPEEDOLET

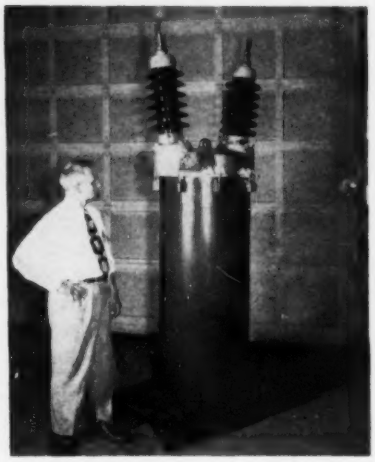
Los Angeles, 123 S. Myers Street
San Francisco, 714 Harrison Street
Seattle, 4130 First Ave., So.
Denver, 1073 Galapago
Kansas City, Mo., 616 W. 26th Street

K KILLARK ST. LOUIS Killark

Write for Speedolet Catalog.

ELECTRIC MANUFACTURING COMPANY

3940 EASTON • ST. LOUIS 13, MO.



Circuit Recloser

(14) *I-T-E Circuit Breaker Co., R&IE Division, Greensburg, Pa.*

A new automatic circuit recloser for 46-kv maximum service application has been announced by this manufacturer. Interrupting ratings have been established at 4,000 amp, rms symmetrical, for 34.5 kv, and 3,000 amp, rms symmetrical, for 46 kv. Continuous current ratings are 400, 280, 140 and 100 amp. Two-cycle instantaneous tripping of transient faults, followed by 25-cycle reclosing with one, two or three inverse time operations are features.

Cable Support Systems

(15) *Chalfant Products Co., 11525 Madison Ave., Cleveland 2, Ohio.*

A new material that combines the surface properties of aluminum with the strength of steel is now being used by this company in the manufacture of lower cost cable support systems. The material is steel that is protected against corrosion with a special aluminum coating. It is said to withstand corrosion, under normal industrial conditions, more than three times longer than zinc coated galvanized steel.

Street Light Control

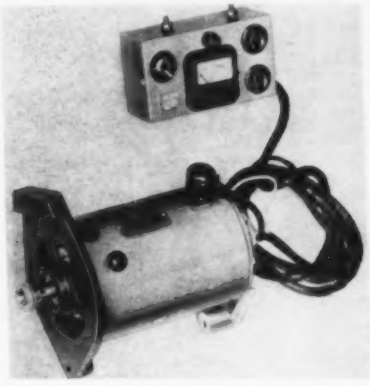
(16) *Micro Balancing Inc., Garden City Park, L. I., N. Y.*

A tubeless street and highway lighting control is offered by this company. The circuit eliminates the use of vacuum tubes. Light is sensed by a hermetically sealed, replaceable cell, and switching is by a hermetically sealed electrostatic relay.

Overvoltage Protector

(17) *A. B. Chance Co., Centralia, Mo.*

This new device protects series capacitor banks from damaging overvoltages when fault currents flow through the banks. The device has a NEMA standard cutout mounting bracket for hanging on the crossarm. In the device is a pair of gap electrodes and a spiral electrode which whirls the arc around inside the housing and cover, preventing localized burning.

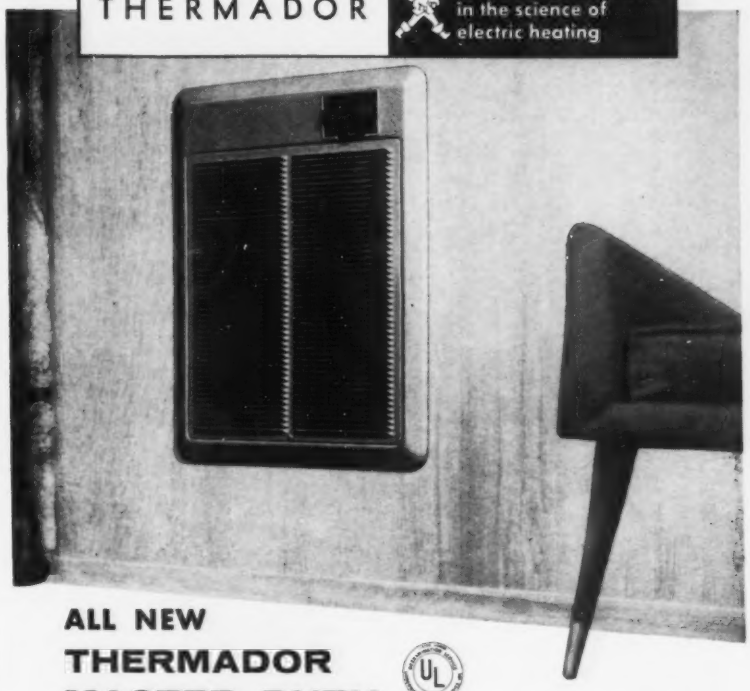


Power Source

(18) *Kurland Combinator, Denver 3, Colo.*

This new generator provides both a-c and d-c power in the field. It either replaces or is used in conjunction with original equipment generators on trucks. Called "Combinator," the unit provides electricity for any power tool that normally uses house or shop current. An automatic control adjusts engine speed from a normal idle to the correct speed needed to operate the Combinator as a load is put on it.

THERMADOR "Seven Leagues Ahead" in the science of electric heating



ALL NEW THERMADOR MASTER-DUTY

BILT-IN FAN-TYPE ELECTRIC ROOM HEATER

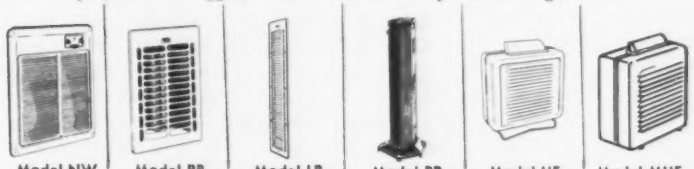
Heats the "Living Zone"

A heater in winter—a fan in summer

- heat-speed efficiency greater than any other heater
- new ease of installation
- the ultimate in room-by-room thermostatic heat control
- new motor location in cold-air stream
- flush-to-wall installation projects less than 1 inch
- new type turbo-fan, quietest ever
- cleaner, safer, healthier—no soot —no flame—no fumes
- new heating element provides instant silent heat
- heat discharged at floor level—circulates thru "Living Zone"
- new Spanish Gold baked enamel finish blends with room interiors

A THERMADOR HEATER FOR EVERY ROOM

Remember, when Thermador is specified, installation is easier, profits are bigger, and customer satisfaction is greater.



Model NW | Model RB | Model LR — BILT-IN ROOM HEATERS

Model PR | Model HF | Model MHF — PORTABLE ROOM HEATERS

The Originator of the Fan-Type Electric Heater

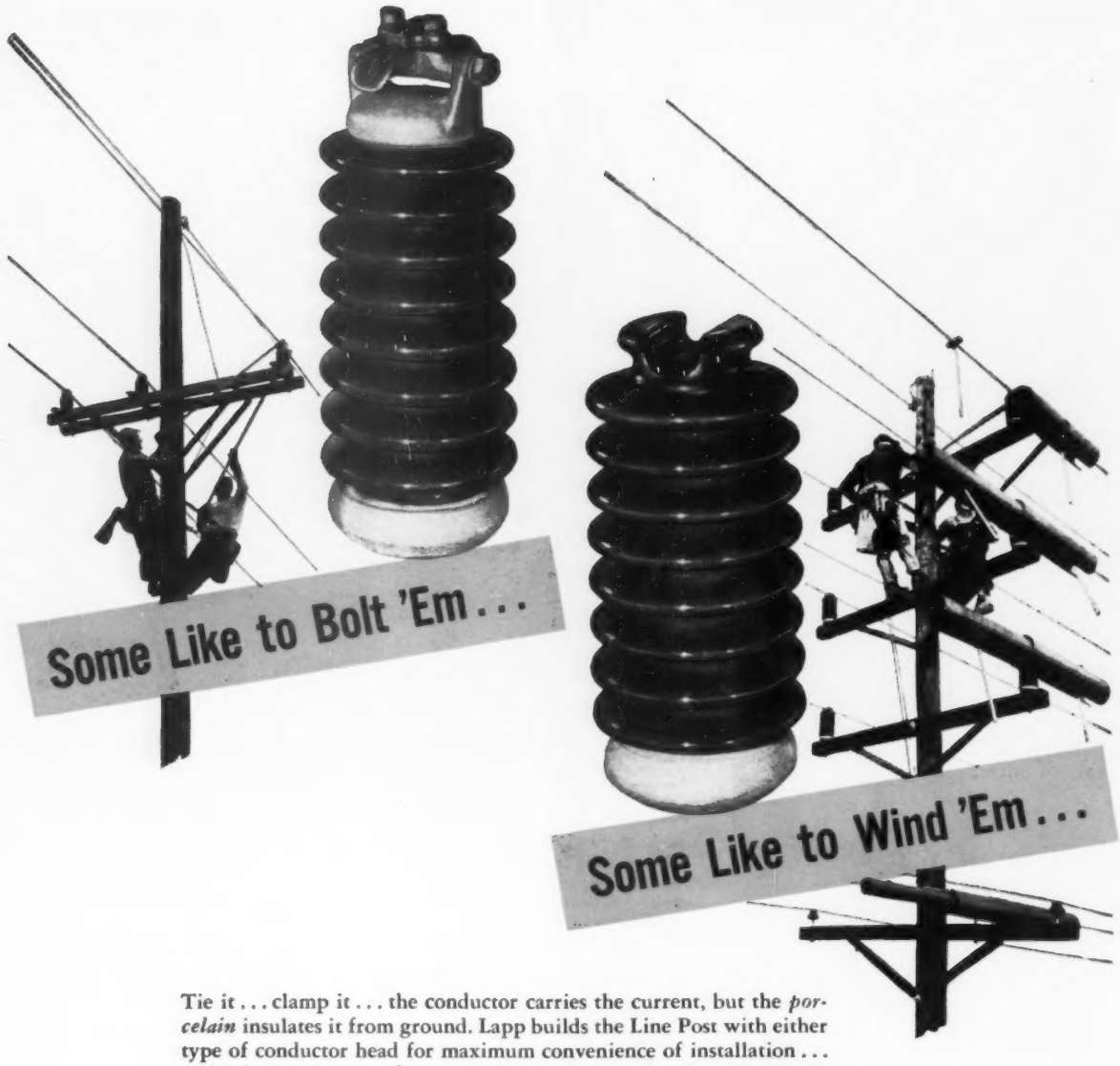
THERMADOR

ELECTRICAL MANUFACTURING COMPANY

Division of Norris-Thermador Corporation

5119 District Blvd. • Los Angeles 22, Calif.

SCOTTSDALE, ARIZONA—M. H. Kroeker, 7513 Mesquite Dr. • LEMON GROVE, CALIFORNIA—John L. Mooney, 1916 La Corta • OAKLAND, CALIFORNIA—Wm. H. Gribble, 278 Euclid Ave. • DENVER, COLORADO—W. G. Cline Co., 4500 Kalamath St. • OSWEGO, OREGON—Glenn A. Erbes, 1400 Horseshoe Curve • SALT LAKE CITY, UTAH—Walter R. Bills, 211 S. 2nd West • SEATTLE, WASHINGTON—John R. Weber, 2415 - 42nd North • SPOKANE, WASHINGTON—Herbert A. Whitney, N. 4610 Ash



Tie it . . . clamp it . . . the conductor carries the current, but the *porcelain* insulates it from ground. Lapp builds the Line Post with either type of conductor head for maximum convenience of installation . . . and it builds the *porcelain* to do the *insulating* job. The porcelain in either case is a closed-end post, of high density vacuum-process electrical porcelain. It won't puncture because it has no conductive material within it. It outperforms any other type of insulator in dirt conditions because its fog-type design prevents leakage flashover from non-uniform leakage resistance. It stands up under arcover, stones and bullets because its short, sturdy petticoats protect the body. And it won't crack because its hardware, both top and bottom, is *externally* attached, and can load porcelain only in compression.

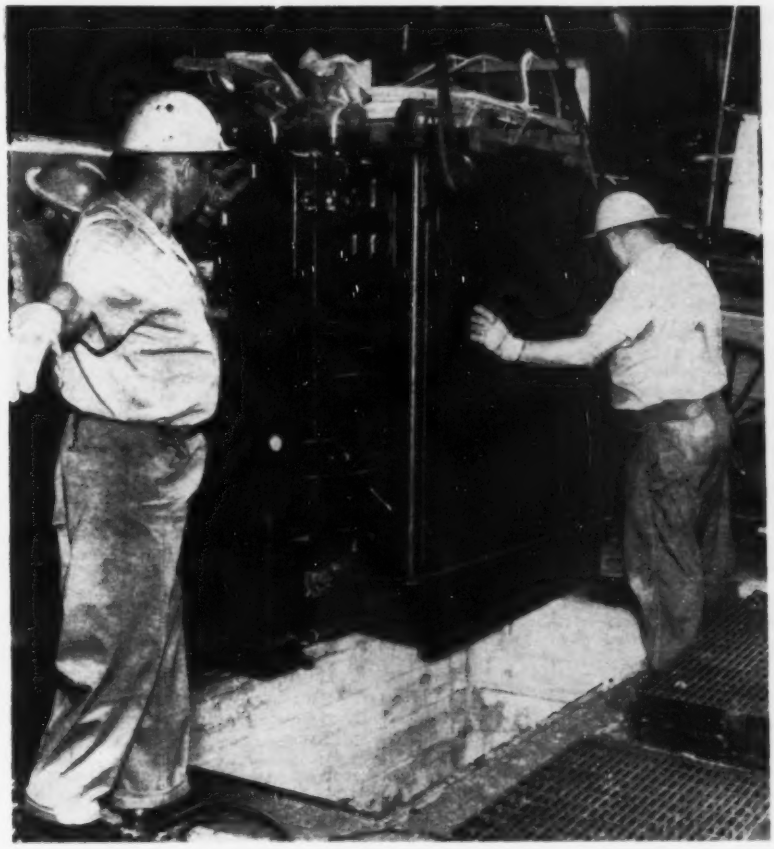
With tie-wire or clamp-top, the Lapp Line Post will give you an *extra* margin of operating security, low upkeep, long life.

Lapp Insulator Co., Inc., Le Roy, N. Y.

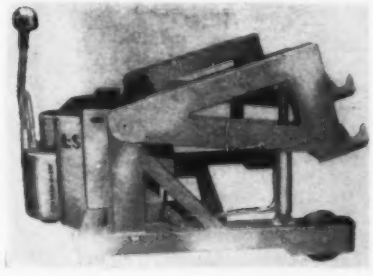
WESTERN REPRESENTATIVES:
Los Angeles: Earl S. Condon Co.
San Francisco: C. E. Ingalls & Sons
Seattle: Charles F. James
Butte: R. E. McDonough Co.
Salt Lake City: Riter Engineering Co.

Lapp

Vapor-Cooled Transformer



The world's first and only transformer in commercial operation utilizing high dielectric strength gas went into operation recently. Developed by Westinghouse, it is a 500-kva submersible unit operating on the network system of the Consolidated Edison Co. of New York.



Cable Handler

(19) *Lewis-Shepard Products Inc., 125 Walnut St., Watertown 72, Mass.*

An electrically powered "walkie" truck for handling cable reels of varying sizes has been developed by this manufacturer. Available in capacities to 20,000 lb, the truck can handle reel diameters from 36 to 90 in. Maximum reel width is 68 in. No manual adjustments of the lifting hooks are required for the full range of diameters. Twin hydraulic cylinders, one attached to each lifting arm, are synchronized to lift simultaneously. Lifting and lowering controls, as well as brake, traction, direction and horn controls, are in handle.

Oil Switch

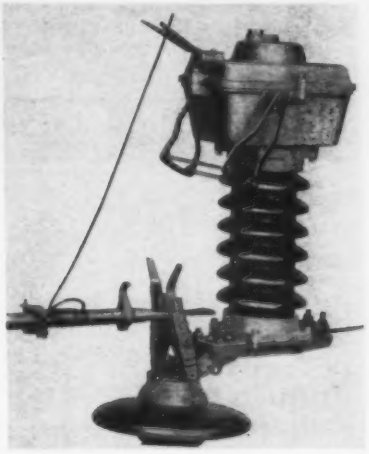
(20) *Line Material Industries, McGraw-Edison Co., Milwaukee 1, Wis.*

This new 400-amp, three-phase oil switch is said to limit high-frequency inrush currents caused by step switching of capacitors. It is rated at 15-kv and 110-kv BIL. It has a motor-driven mechanism for remote electric operation. Resistors, placed in series with arcing contacts of the units, limit the magnitude of high-frequency transient currents caused by energized capacitors attempting to discharge into immediately adjacent de-energized capacitors. Applicable to systems with phase-to-phase ratings of 14.4 kv and below. They switch 330 amp of capacitive current.

Protective Compound

(21) *Penn-Union Electric Corp., Erie, Pa.*

Application of this new protective compound to electrical connections is said to be quick and effective. Connections are covered completely by the pliable compound, regardless of the size and shape. It is reported to be air- and water-tight, with no residual tension to pull it away from the connection. Dielectric strength is 139 v/mil in the thickness supplied.



Interrupters

(22) *Line Material Industries, 700 W. Michigan, Milwaukee 1, Wis.*

Addition of new 46- and 69-kv oil interrupters completes this company's line from 23 to 69 kv. The units mount on new or existing vertical break, group operated, outdoor horizontal mounted air switches to interrupt or pick up load currents and transformer magnetizing currents. All interrupters have a current rating of 600 amp. Each interrupter unit consists of an oil-filled porcelain housing, internal contacts and mechanism, and an external rod to shunt the current through the interrupter while the main switch blade is being disconnected.

Preferred by Leading Manufacturers . . . and Best for YOUR *Customers!*

CORNISH

RUBBER • NEOPRENE • PLASTIC

Flexible Cords

In convenient lengths on smart lithographed metal spools for fast over-counter action. For absolute uniformity, superior electrical qualities and ultimate economy, sell 'em CORNISH . . . the BEST!

CORD SETS

For home, farm and industry now available in COLOR. Engineered and produced in modern plants . . . the BLUE CHIPS of industry, worth a push for PROFIT.

CORNISH WIRE CO., INC.

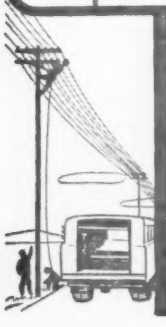
50 Church Street New York 7, N. Y.

INDIANA STEEL & WIRE CO. Crapo Galvanizing MUNCIE, IND.

Signs along the lines of *Crapo* **GALVANIZED STEEL STRAND PERFORMANCE**

For dependable performance . . . insist upon *Crapo* Galvanized Steel Strand. Superior tensile strength, combined with long-life, ruggedness and workability, makes *Crapo* Steel Strand first choice for guys, messenger and overhead ground wire.

The famous *Crapo* galvanizing process provides dependable protection for the steel, prolongs the expectant life of the strand.



- Low maintenance cost
- Laboratory tested and controlled quality
- Meets highest quality standards
- A size and grade for all practical needs
- Contact your *Crapo* Jobber Today!

INDIANA

STEEL & WIRE CO., INC.

Muncie, Indiana

BULLETINS ETC.

(23) LIGHTING—The Wakefield Co., Vermilion, Ohio, has reproduced four papers on theory, generation, progress and application of high frequency-high voltage current to lighting. Included is a cataloging of the company's lighting equipment design for this field.

(24) SWITCHGEAR-CIRCUIT BREAKERS — Major operating and maintenance innovations of its new K-line circuit breaker and switchgear equipment are featured in a bulletin published by I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30, Pa.

(25) HEADGEAR LINERS — Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa., has published a four-page brochure on its winter liners for protective hats.

(26) OPERATIONS RECORDER — New Catalog 30A1400 describes Fischer & Porter Millisecond Operations Recorder for continuous automatic logging of power station operations for a stated 1/3 cost savings. Write to the company at 488 Jacksonville Rd., Hatboro, Pa.

(27) TRANSFORMER SERVICE—A comprehensive transformer service manual for operating and maintenance personnel of utilities and industries has been published by Allis-Chalmers. General information, construction details and industry standards are given in the 150 pages. Write to the company at Milwaukee 1, Wis.

(28) ARRESTERS—Ultra-Valve Type F intermediate class lightning arresters are described in Bulletin LA4 of Line Material Industries, McGraw-Edison Co., Milwaukee 1, Wis.

(29) DRY-TYPE TRANSFORMERS — A new engineering manual on four series of dry-type distribution transformers has been published by R. E. Uptegraff Mfg. Co. Write to the company at Scottsdale, Pa. Ask for Bulletin 137.

(30) MOVIE — Improved distribution system reliability and conductor protection is the theme of the latest Line Material Industries movie, "The New Type W Oil Circuit Recloser." It acquaints operating personnel with features of the Type W. Write to Line Material Industries, McGraw-Edison Co., Milwaukee 1, Wis.

(31) CAPACITORS — GEA-6657 is an eight-page booklet that describes pole top fixed capacitor equipments for distribution circuits. Publication lists ratings, weights, dimensions and includes charts, diagrams and photos. Write to General Electric Co., Schnectady 5, N. Y., or fill in coupon.

(32) GENERATORS—Synchronous generators for hydroelectric generation of power is the subject of a new 24-page brochure published by Elliott Co., Jeannette, Pa. Diagrams illustrate construction of two vertical types of generators: suspended construction for machines of 240 rpm and above, and umbrella construction for machines below 240 rpm. Data on horizontal shaft generators also are presented.

(33) CABLE SUPPORT FILE—T. J. Cope Division of Rome Cable Corp., Collegeville, Pa., is offering a folder file on cable supports. When file is mailed, owner's name is entered on mailing list to receive additional information as it is available.

(34) LIGHTING EQUIPMENT — The new Wakefield lighting equipment catalog for contractors (No. C-57) features a visual index of 13 basic models and various combinations. Includes details for laying out designs for ceilings. Write to the company at Vermilion, Ohio.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after March 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34

If described in advertising, fill in page number

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

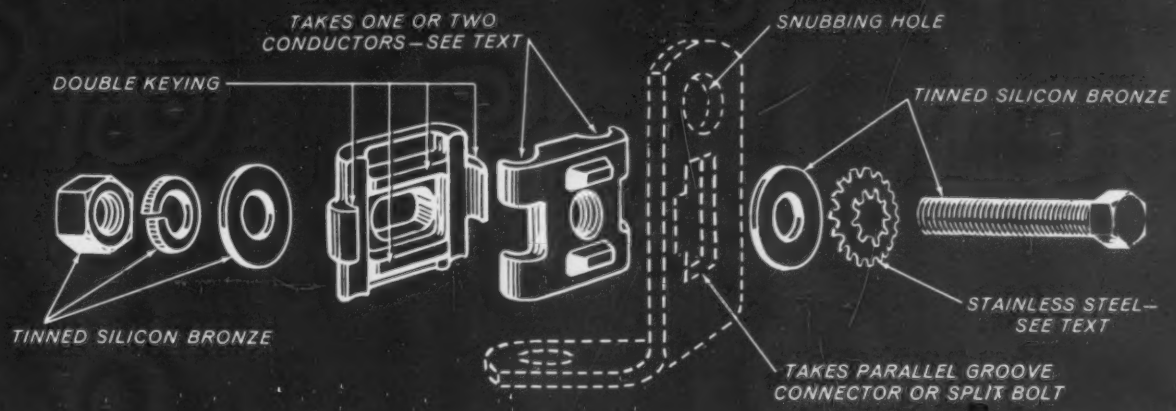
NAME ..... TITLE .....

COMPANY .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

*Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.



now! parallel groove connectors on S&C's Open Cutout

If you're coming into a cutout with aluminum, chances are you will want a parallel groove connector. With S&C's Type XS Open Cutout you can have this feature at no charge.

Expressly designed for use with aluminum conductors, this new parallel groove connector has an unusually large gripping area. The connector halves are doubly keyed to each other, insuring uniform gripping of conductor, regardless of size. The connector takes one or two aluminum conductors—copper too, of course—up to 2/0 stranded or 1/0 ACSR.

Making connections is easy. Connector halves are keyed to each other and to the cutout to prevent rotation. You need only one wrench to make up the connectors, since a stainless steel internal-external tooth lockwasher holds the connector body mounting bolt against turning. And, for each tightening of the connector with lineman's tools, there is a generous size nut—5/8" across flats.

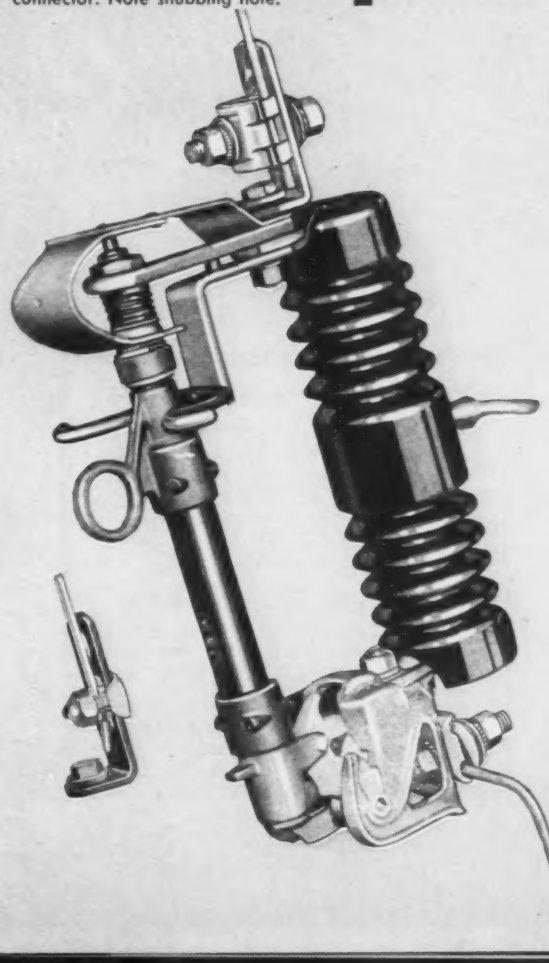
Larger parallel groove connectors are available at slight charge. These connectors accommodate one or two conductors, from No. 2 solid aluminum (or copper) to 4/0 standard aluminum, copper, or ACSR.

As an optional standard the split-bolt connector is available at no extra charge. Maximum conductor size is No. 1 stranded—copper or aluminum.

S&C Electric Company, 4425 Ravenswood Ave., Chicago 40, Ill. In Canada: S&C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ont.

S&C ELECTRIC COMPANY

Type XS Open Cutout—7.5 kv, 100 amperes continuous, 12,000 amperes interrupting—shown with parallel groove connectors. Insert (below) shows optional split-bolt connector. Note snubbing hole.



501 Kva Cluster-Mounted on One Pole...

Detroit Edison does it with 3 167-kva Featherweight POLE STARS

Here you see how Detroit Edison Company solved the problem of serving a small manufacturing plant without going to the trouble and expense of installing either a second pole and platform, or a vault.

Cluster-mounting of Featherweight Pole Star 167's can be an effective, economical way to provide power for shopping centers . . . or to increase service to newly expanded commercial sections. Introduced by Pennsylvania in 1953, Featherweight Pole Stars "pioneered" the extension of pole mounting to 167-kva transformers. They have proved easy to handle, easy to install under all conditions . . . and linemen like the "slim" Pole Star design that encroaches so little on the climbing area.

Featherweight Pole Star 167's are available for pole mounting in every standard distribution voltage through 16,340 volts. Like all other members of the Pole Star line, they offer the long-range advantages of Pennsylvania's patented "lap-on-top"core.

Pennsylvania Transformer Division, McGraw-Edison Company, Box 330, Canonsburg, Pa.

Why Utility Engineers asked for this POLE STAR *transformer*

★ Will replace any single phase 75- or 100-kva pole-mounted transformer to provide 67% to 123% more capacity

★ Weighs less than 1500 pounds

★ Lower in overall height than average 100-kva transformer

★ Available in standard voltages up through 16,340 volts

Mechanical Characteristics

Weighs approximately 1500 pounds.
Conforms to EEI-NEMA Sixth Report.
Overall floor space slightly larger than average for 100-kva transformers.
Overall height approximately 8" less than industry average for 100-kva transformers.

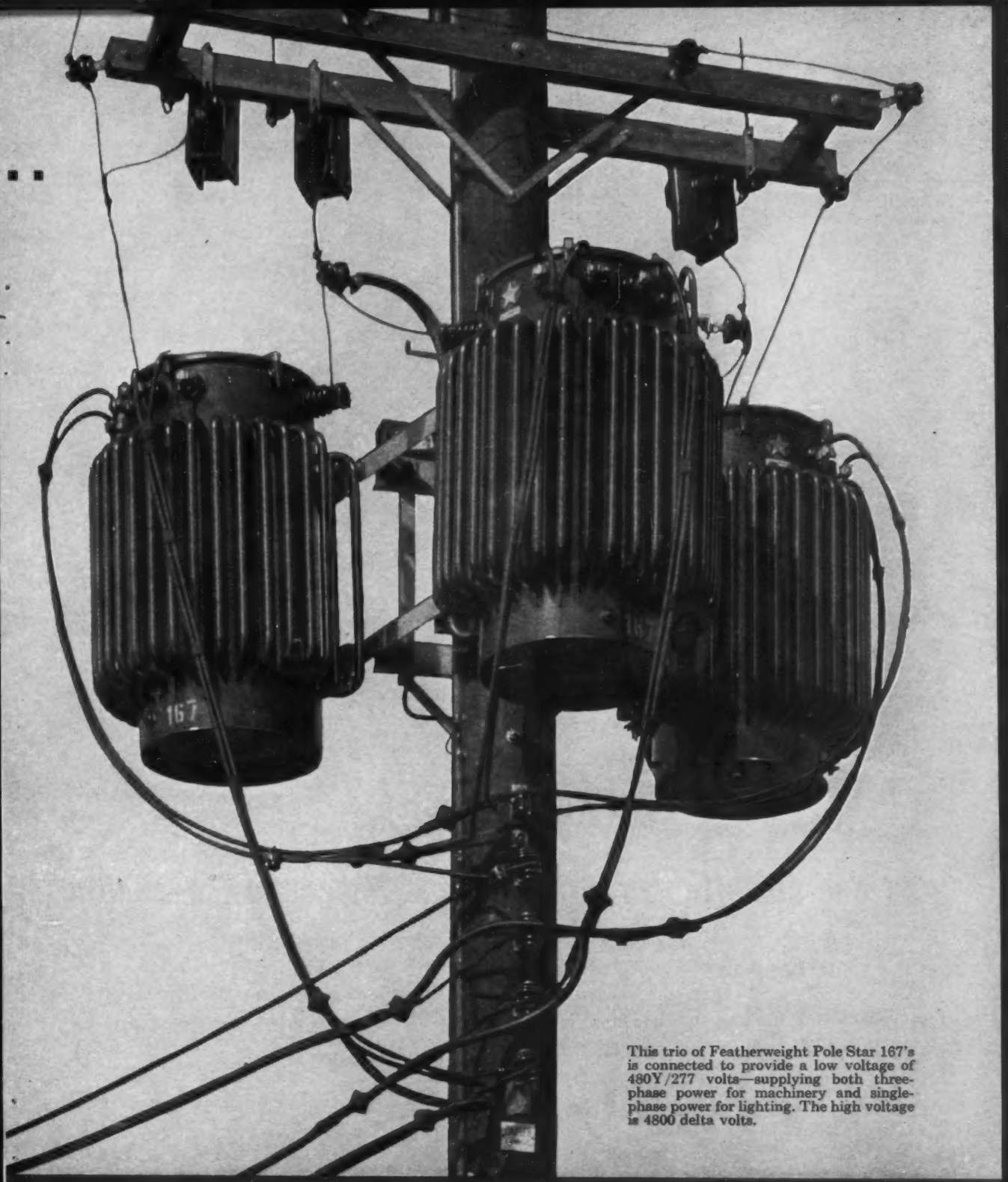
Electrical Characteristics

Patented "lap-on-top" Pole Star core, combined with effective coil design, results in low losses, low impedance, and good regulation.
Low exciting current found in all Pole Star designs also is inherent in the 167-kva Featherweight Pole Star.

McGRAW EDISON

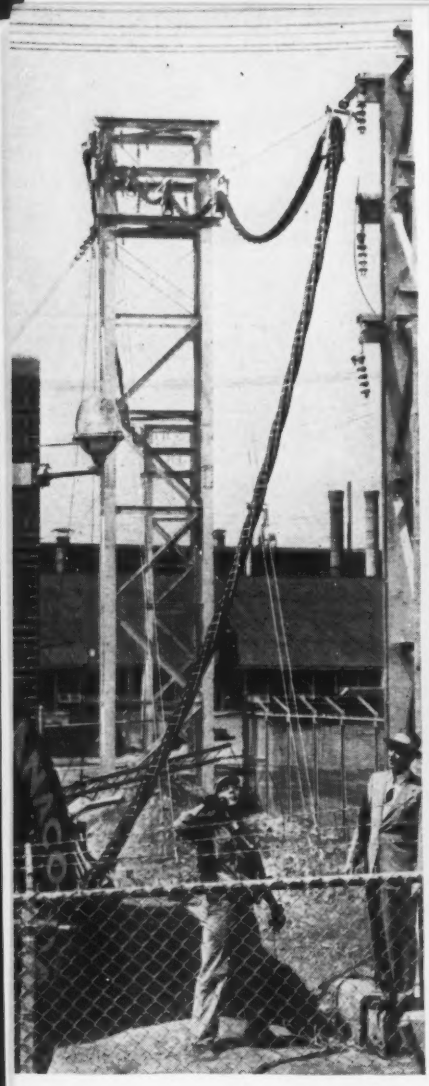
PENNSYLVANIA TRANSFORMERS pt

PENNSYLVANIA



This trio of Featherweight Pole Star 167's is connected to provide a low voltage of 480Y/277 volts—supplying both three-phase power for machinery and single-phase power for lighting. The high voltage is 4800 delta volts.

DISTRIBUTION TRANSFORMERS



Overhead . . . in ducts . . . underground

Order one cable for all three jobs . . . Anaconda Durasheath

Overhead . . . in ducts . . . underground. Use Durasheath* neoprene-jacketed cable for every type of power application up to 15 kv. Tough jacket resists weather, soil acids, abrasion, mechanical injury.

One continuous run without splices. Run Durasheath from underground, to overhead, to ducts, *in one length* without splicing. Light, flexible, it handles easily. Costs less to install.

Stock one cable instead of three. You save space, paperwork with all-purpose Durasheath. One cable does the work of three. You cut inventory. Versatile Durasheath excels everywhere.

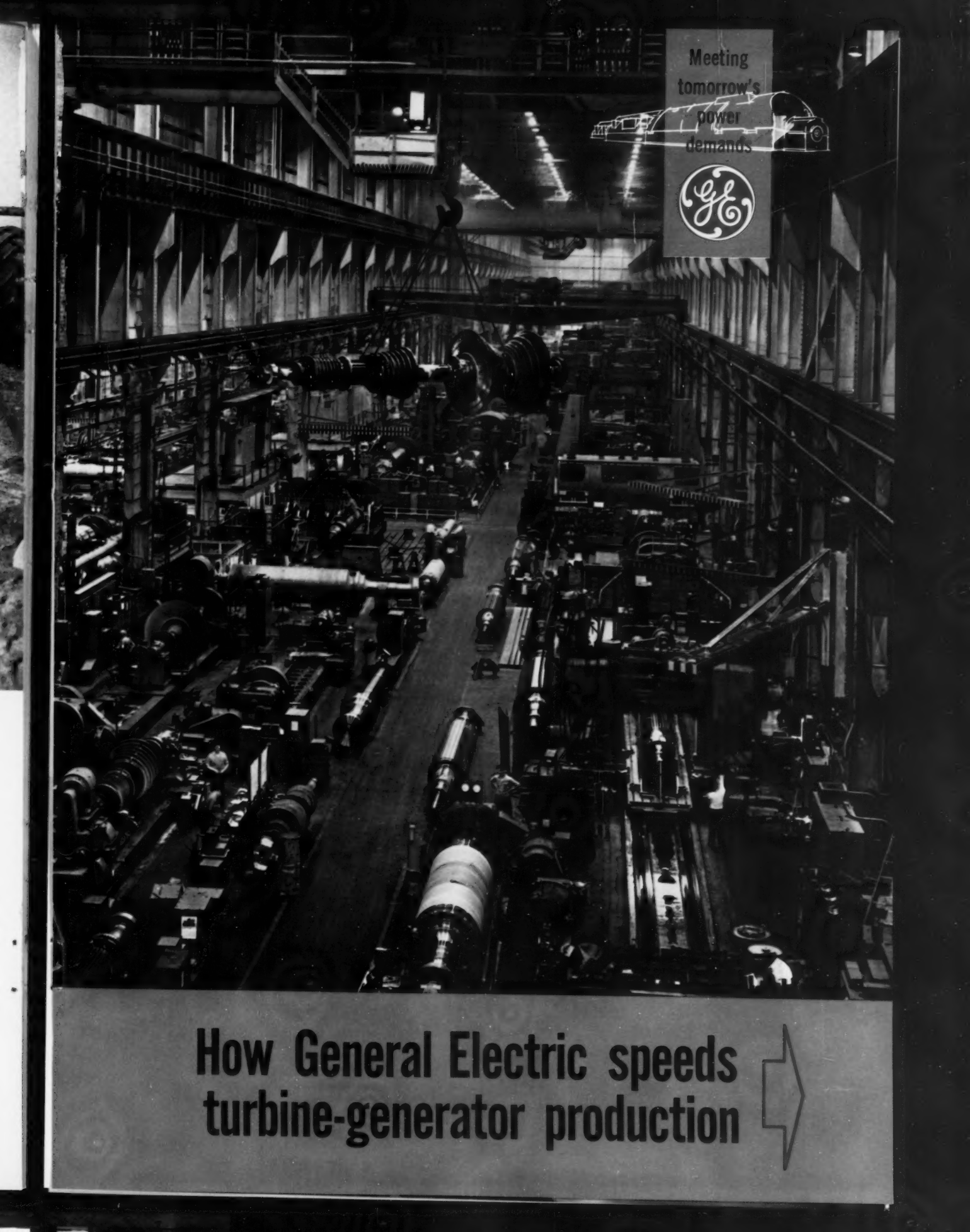
See the Man from Anaconda or your Anaconda distributor for full information. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

*Trade Mark 57361

FASTEST WESTERN SERVICE – At Orange, California, Anaconda's expanded, modernized mill fabricates and stocks copper and aluminum wire and cable for *every type of application*. Anaconda's Western Distributors thus can assure the fastest possible service on all West Coast needs. See Anaconda Sales Offices: Los Angeles, San Francisco, Seattle, Denver.

LIVE BETTER ELECTRICALLY

ASK THE MAN FROM **ANACONDA®**
FOR **DURASHEATH CABLE**



How General Electric speeds turbine-generator production

Advanced machines and techniques improve General Electric's turbine-generator output

Expanded facilities will soon add to the production capacity of the large steam turbine-generator plant. Shown reviewing expansion plans are H. R. Hill, Mgr-Manufacturing, C. A. Lilly, Mgr-Marketing, and W. E. Saupe, Gen'l Mgr.

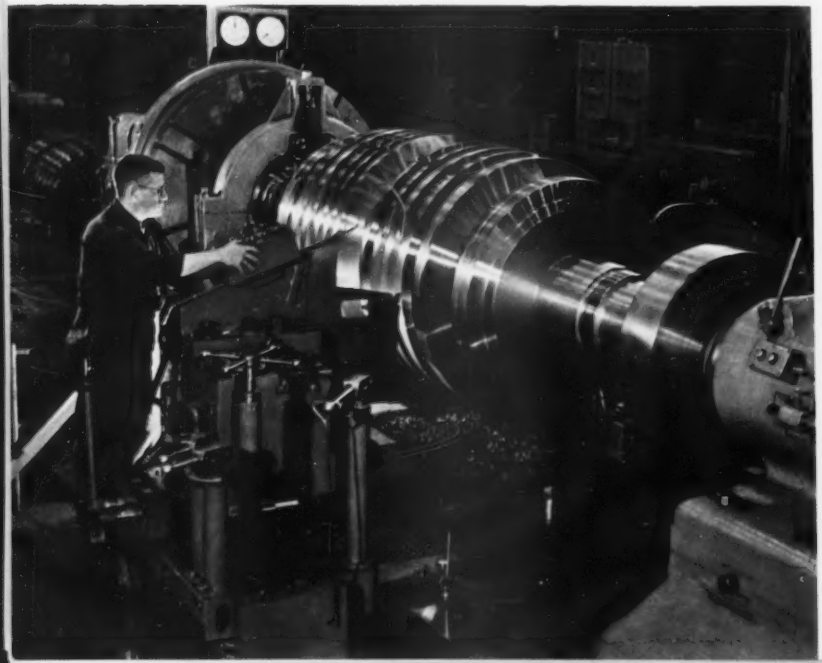
Meeting the requirements of the constantly expanding electric utility industry sets a challenge that is answered by General Electric's continued investment in its large steam turbine-generator manufacturing facilities in Schenectady.

New machine tools – some of them the largest ever made and the only ones of their type – add to the production efficiency required to build precision turbine-generator components, many with tolerances as close as those of a fine watch. Combined with General Electric's organization of skilled craftsmen and turbine-generator engineers, these tools and facilities provide the flexibility needed to keep pace with today's rapid advances in turbine-generator technology. And, in building tomorrow's even more efficient and reliable machines of advanced design, this combination will help maintain a well-established reputation for meeting delivery commitments.

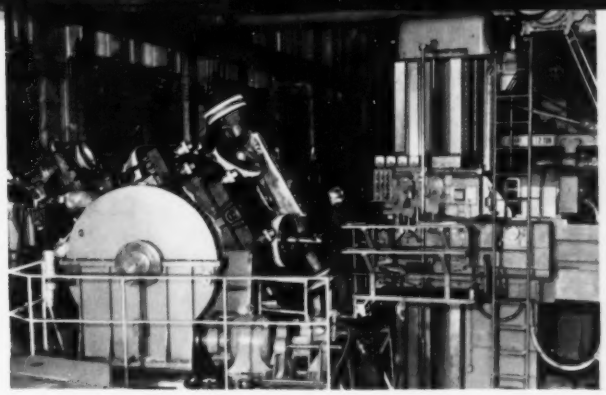
A few of the facilities in the large steam turbine-generator plant that contribute to these outstanding achievements are shown here.

GENERAL ELECTRIC

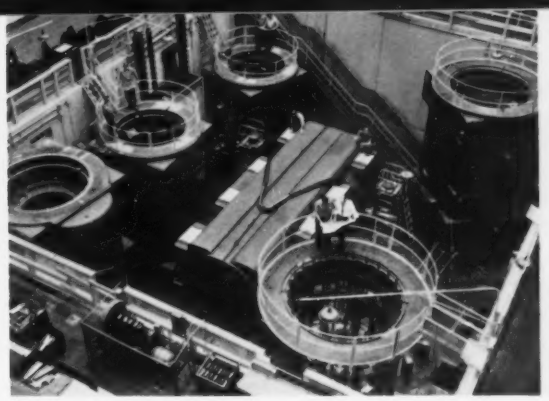
Grooving lathe removes metal from this turbine rotor at the rate of 100 cubic inches per minute – can take 25-ft forgings weighing up to 100 tons and is equipped to machine deep grooves up to 2½ inches wide.



Traveling reamer brings machine to job. Here, unit reams holes in turbine wheel and dovetails of 43-inch buckets.



Horizontal boring mill has special fixture for positioning and machining 100-ton turbine shells at complex angles. This unique arrangement considerably reduces set-up time.



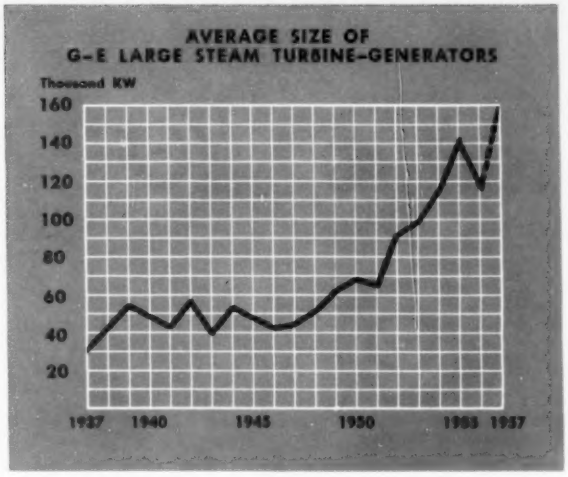
30-ft deep stacking pit accommodates six generator stators at the same time for stacking laminations. Each of the six stations has its own hydraulically operated press.

World's largest adjustable rail milling machine, capable of work equivalent to three 18-ft planers, saves time by allowing work to be set up on one table while machining proceeds on the other. Shown here machining a 225,000-kw generator stator frame, this mammoth unit stands 35-ft high, is 120-ft long and weighs 1,230,000 pounds.

General Electric is helping to meet tomorrow's power demands . . . today

To keep pace with the tremendous design advances of tomorrow's powermakers, new manufacturing techniques are continually being developed, and additional unique production tools are being designed and built. Already, electronic and magnetic tape controls are being applied to increase speed and improve accuracy of some machining processes.

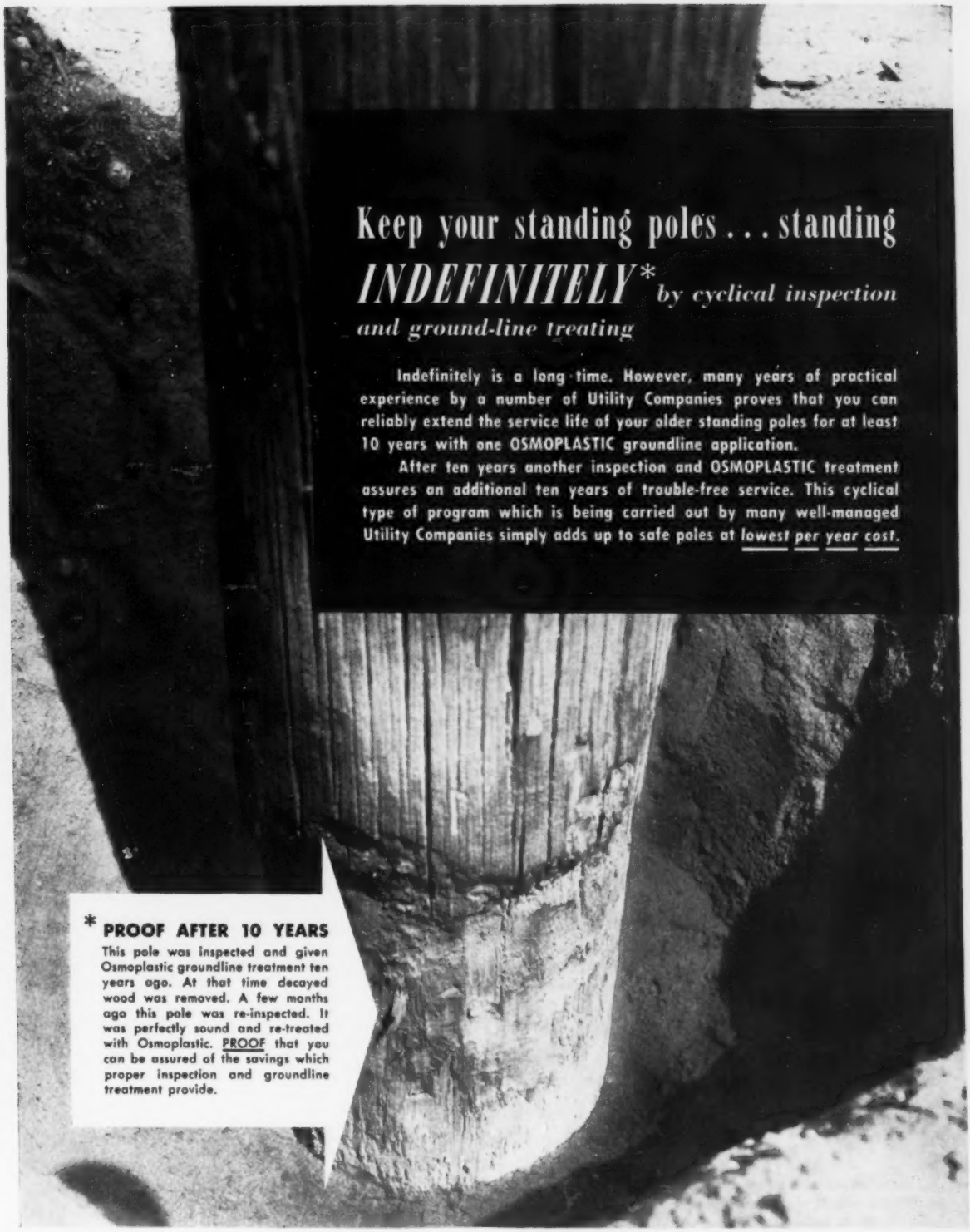
Such forward-thinking investment in new tools and facilities for building large steam turbine-generators gives assurance that General Electric will continue to help the electric utility industry maintain its spectacular record of meeting the nation's constantly expanding power needs. Large Steam Turbine-Generator Department, Schenectady, New York. 254-54



Larger units, ranging up to 450,000 kw in size, are now being designed and built. Historical growth in average size of powermakers shipped from Schenectady is shown here.

Progress Is Our Most Important Product

GENERAL ELECTRIC



Keep your standing poles . . . standing *INDEFINITELY** *by cyclical inspection and ground-line treating*

Indefinitely is a long time. However, many years of practical experience by a number of Utility Companies proves that you can reliably extend the service life of your older standing poles for at least 10 years with one OSMOPLASTIC groundline application.

After ten years another inspection and OSMOPLASTIC treatment assures an additional ten years of trouble-free service. This cyclical type of program which is being carried out by many well-managed Utility Companies simply adds up to safe poles at *lowest per year cost.*

*** PROOF AFTER 10 YEARS**

This pole was inspected and given Osmoplastic groundline treatment ten years ago. At that time decayed wood was removed. A few months ago this pole was re-inspected. It was perfectly sound and re-treated with Osmoplastic. PROOF that you can be assured of the savings which proper inspection and groundline treatment provide.

In 15 years we have treated over two million poles without one dissatisfied customer.

DAN KAMPHAUSEN CO.

CONTINENTAL OIL BLDG., DENVER 2, COLORADO

Pole Inspectors & Treaters, Inc. **Pole Sprayers, Inc.**

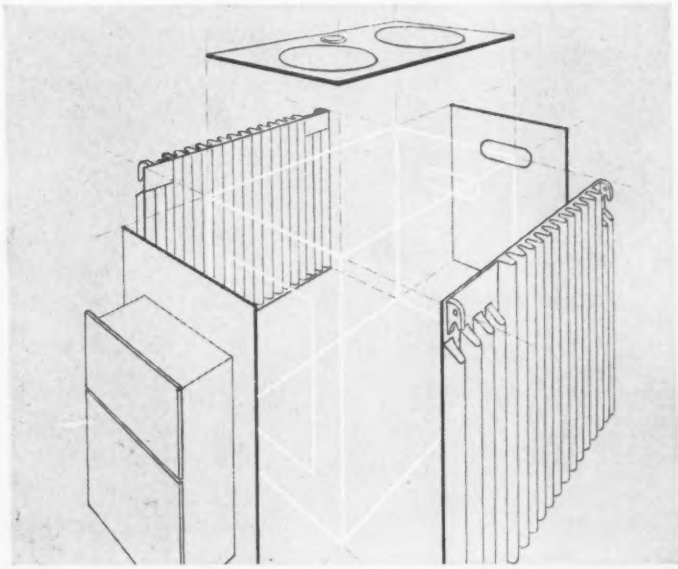
For years, Moloney has conducted research to improve the tank construction of network transformers. Several years ago, Moloney developed a practical way to corrugate heavy gauge steel plate and experimentation in corrugated tank construction was undertaken.

Extensive research eventually lead to a tank design which was mechanically strong and had a minimum of welded joints that corrosion might attack.

Moloney Corrugated Tank Network Transformers, subway or vault type, are available in sizes up to 1000 KVA. ME57-24

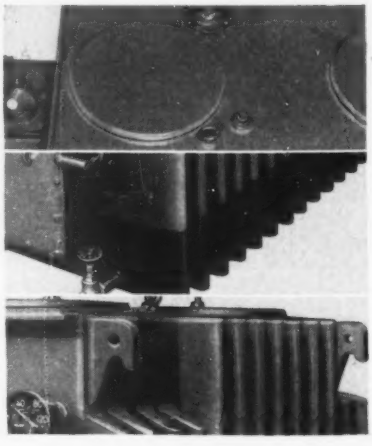
Corrugated tanks offer these advantages to users of network transformers:

- Smaller overall size of the transformers and consequently smaller vaults.
- Tanks may be cleaned from above and repainting is easier as there are no inaccessible areas.
- Vertical tank surfaces shed corrosive matter and consequently contribute to longer tank life.

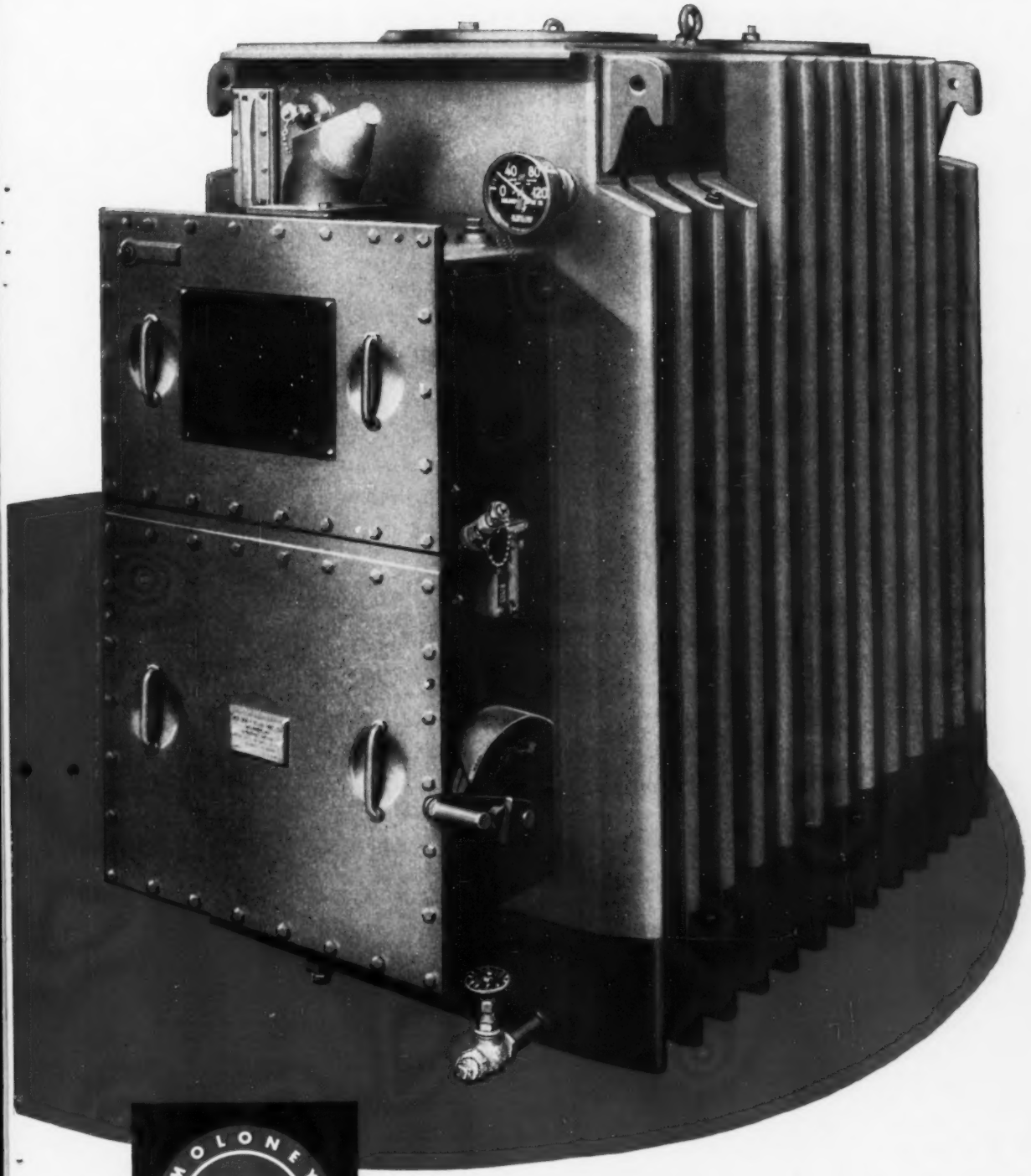


A NEAT PACKAGE . . .

- Corrugated tank wall is made of one piece of steel. Continuous seam welds are made only at the four corners of the tank, around the low voltage throat and high voltage switch and at the junction of the tank walls and the bottom, greatly reducing the possibility of leaks.



- Tank covers and handholes are welded on, absolutely sealing the tank against the entrance of moisture.
- Undercoating of the tank base and the lower part of the tank wall gives maximum protection against rust and corrosion.
- Lifting hooks do not extend beyond the maximum measurements of the tank.



MOLONEY ELECTRIC COMPANY

Manufacturers of
Transformers for Utilities, Industry, and Electronic Applications

SALES OFFICES IN ALL PRINCIPAL CITIES
FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

DON'T YOU MISS
THE GREATEST WESTERN SHOW OF ALL
THE 9th BIENNIAL ELECTRICAL INDUSTRY SHOW

(Sponsored by the Electrical Maintenance Engineers Assn.)

For details, contact
Fred J. Tabery, Exhibit Manager, EMEA
3443 South Hill Street, Los Angeles, California
RIchmond 9-1091

SHRINE EXPOSITION HALL
LOS ANGELES, CALIFORNIA
MARCH 27, 28, 29

This is the PROVEN show for the electrical industry...a SELLING SHOW attracting a QUALITY attendance from the 11 Western states..the most rapidly expanding market in the country according to business experts.

Anyone whose business is related to the design, engineering, use, operation, maintenance, sale or manufacture of electrical and allied equipment—or the application of electricity in the industry—will find this show a MUST.

These and many other firms, representing the WHO'S WHO of the industry, will display their products and services...

Agencies Co.
Air Powered Hot Stick, Inc.
F. J. Airey Co., Inc.
Allen-Bradley Co.
Allied Industries
Allied Masonry Anchors
American Pamcor, Inc.
The Louis Allis Company
Anaconda Wire & Copper Co.
Kenneth Anderson Co.
Appleton Electric Co.
The Arrow-Hart & Hegeman Electric Co.
Automatic Switch Co.

Belden Manufacturing Company
Benjamin Electric Mfg. Co.
Blackhawk Manufacturing Co.
Black & Decker
Brenner-Fiedler Co.
Briegel Method Tool Co.
Brooks Motor Corporation
The Bryant Electric Co.
Buchanan Electrical Products
Bulldog Electric Products of Los Angeles
Burndy Corporation
Burton Equipment Co.

Clark Controller Co.
Cottrell Paper Products
California Conduit & Cable
Carol Cable Co.
Century Electric Motors
Clayton Mark & Co.
Chester Cable Corporation
Clifton Conduit Co., Inc.
Earl S. Condon Co.
Crouse-Hinds Co.
Cutler-Hammer, Inc.
Continental Wire Co.

Duro Fittings Company
Delco Electric Motors
Diehl Manufacturing Co.
Day-Brite Lighting, Inc.

Electro Capacitors
Emerson Electric Motors
Edwards Company, Inc.
Electro-Tech Products Div., Sun Chemical
Equipment Service Company
Electric Tube Products
Encyclopaedia Britannica, Inc.
Empire Electronics

Federal Pacific Electric
Fenwal Incorporated
Fletcher Electrical Specialty Co.
Fluorescent Fixtures of Calif.
Frazier Wright Co.
Fulnas Manufacturing Co.
Frankel Connector Company
Feedrail Corporation

General Electric Co.
General Radio Co.
Glenmart Company
Globe Lighting Products
Gedney Electric Co.
Greenlee Tool Company

Hatfield
Helwig Company
Hill Transformer Co.
Hilti Corporation
Hoffman Electric
Harvey Hubbell, Inc.
Howard Electric Co.

Ideal Industries, Inc.
Ilsco Corporation
Insulation Mfg. Co.

Johnson Bearings Co.
Johns Manville Corporation
Jeffries Transformers

Katolight Corporation
Kaiser Aluminum & Chemical Sales

Lapp Insulator Co., Inc.
Larsen-Hogue Electric Co.
McLoughlin Company
Maddox Sales Co.
Mall Tool Co.
Milwaukee Electric Tool
Mullenbach Div., Electric Machinery Corp.
Michel Bros.
Mosley Electronics
National Electrical Products Corporation

Ray J. Noel Co.
New Hermes Engraving Machine Corp.
Nye Tool Company
National Parts Distributors

O. Z. Electric Manufacturing Co.
The Ohio Carbon Co.
The Oster Manufacturing Co.
D. W. Onan & Son

Paragon Electric Company
The Jack Payne Co., Inc.
J. G. Pomeroy
Roy Peck Associates
The Pyle National Co.
Pittsburgh Standard Conduit Co.
Price & Rutzebeck
P-W Industries, Inc.
Preformed Lines Products Co.
Pyramid Instrument Corp.

Republic Steel Corporation
Reliance Electric & Engineering
H. G. Rising, Inc.
The Ridge Tool Co.
The Ruby Lighting Corporation
Rutkin Electrical Sales Company
Russell & Stoll Company
S & M Lamp Co.
Shalda Manufacturing Co., Inc.
Slater Electric & Mfg. Co.
Sierra Electric Co.
Smoot-Holman Co.
Square D Co., Western Division
EC&M Division, Square D Company
Steber Manufacturing Co.
Standard Carbon Company
Stonco Electric Products Co., Inc.
The Superior Electric Co.
Sylvania Electric Products, Inc.
Southern Car & Manufacturing Co.
Sunbeam Lighting Co.

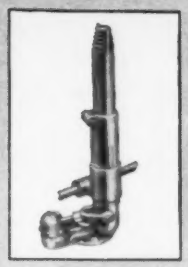
The Thomas & Betts Co.
Twinlock, Inc.
The Toledo Pipe Threading Machine Co.
Tri-State Supply Corporation

U. S. Electrical Motors, Inc.
Velocity Power Tool Co.

Wadsworth Electric Company
Ward Leonard Electric Co.
Western Insulated Wire Co.
Westline Products Div., Western Lithograph
Western Tool Industries
Weston Electrical Instruments
Westinghouse Electric Corporation
Witte Diesel Works
The Wiremold Company
Robert A. Young Co.
Zinsco Electrical Products

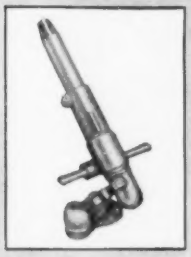
Recognizing the vital role of EDUCATION in today's industry EMEA has combined with the 1958 exhibit their 5th ELECTRICAL MAINTENANCE CONFERENCE...highlighting such important subjects as...

• Plan Maintenance to Prevent Breakdown • Large Industry Looks at Maintenance of Electrical Equipment • Small Industry Looks at Maintenance of Electrical Equipment • Commercial Buildings Look at Maintenance of Electrical Equipment • Electronic Equipment Requires Maintenance • Proper Maintenance of Lighting Will Assure Peak Output • How to Estimate Additions and Expansions • High Power Factor Can Pay Big Dividends • Know Your Electrical Codes and Safety Orders • Protective Devices Must Be Properly Selected and Maintained



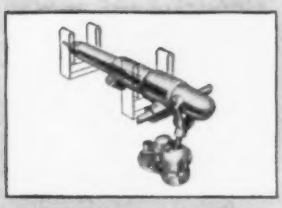
1. SWITCH BLADE IN FULLY OPEN POSITION

Universal link connects blade and crank arm for transmitting forces to the switch blade for full cycle of operation.



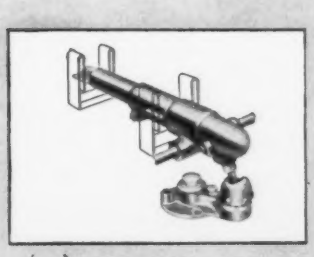
2. SWITCH BLADE CLOSING

Switch blade is moved from the open to closed position by a relatively small angular motion of the crank arm.



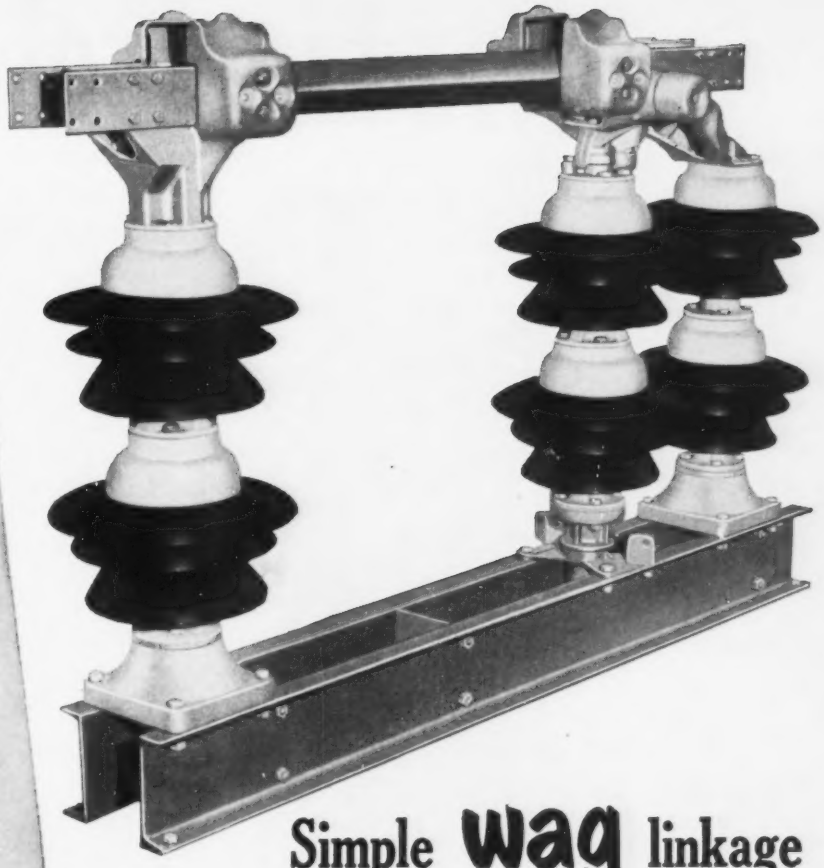
3. SWITCH BLADE ENTERS CONTACTS

In this position the switch blade begins its rotation for full contact engagement. Continued movement of the crank arm will rotate the blade to bring contacts under high pressure.



4. SWITCH WITH CONTACTS FULLY ENGAGED

The simple linkage of the WAG concentrates mechanical advantage so that contact engagement or disengagement is accomplished with a minimum of effort.



Simple WAG linkage boosts mechanical advantage; lessens operating effort

In one sweeping, continuous movement the Type WAG Switch blade swings into the open or closed position. There is no lost motion — no cams, triggers, or latches.

The WAG is operated by a simple system of cranks and levers arranged to transmit maximum torque when the blade rotates to engage or disengage the contacts. By concentrating mechanical advantage where it is needed most, the WAG can be operated smoothly and with less effort.

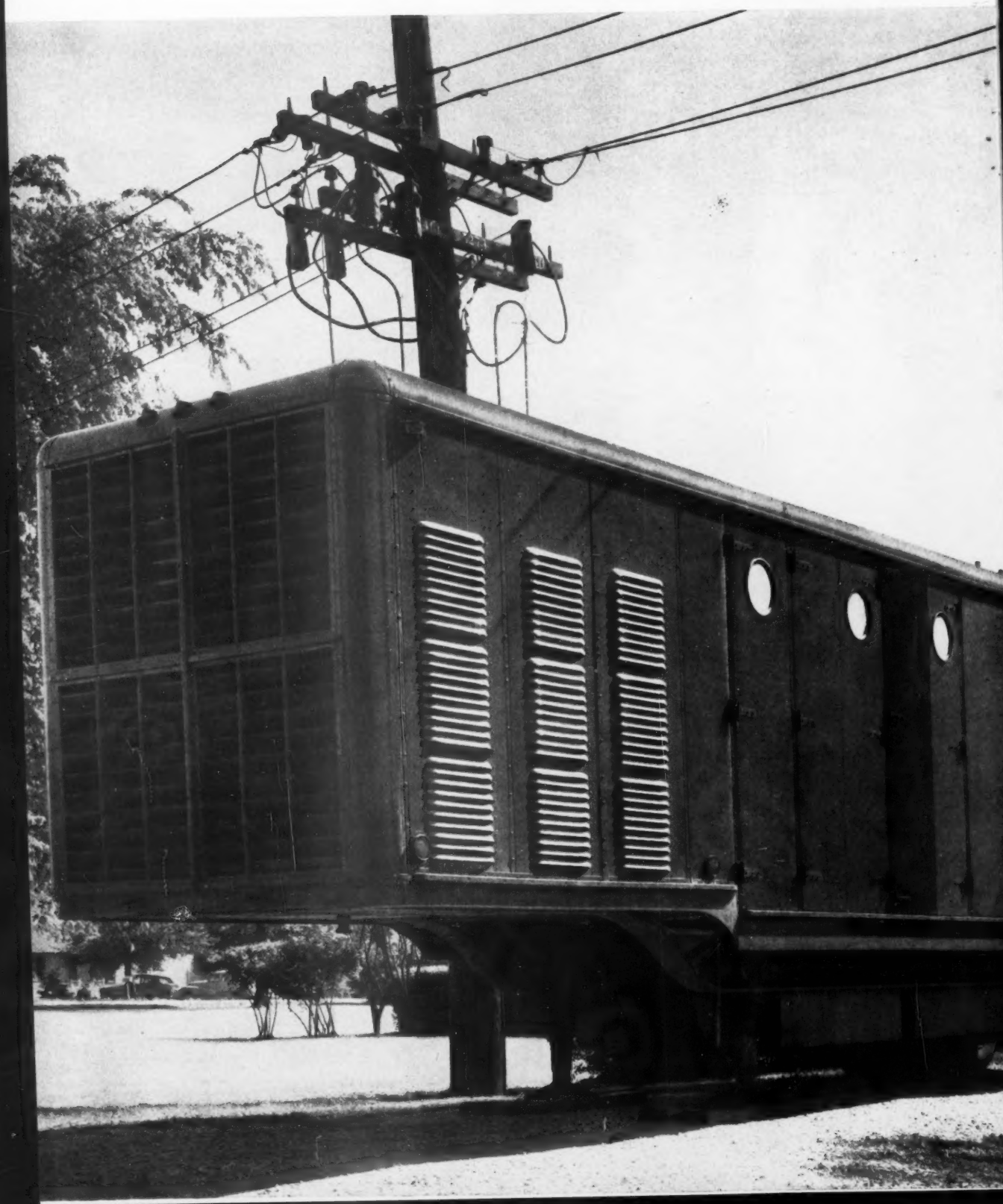
Thus, the Type WAG offers the advantages that engineers recognize as so important: a switch easy to operate, higher contact pressure, and wider contact deflection. The Type WAG has the muscle to break up heavy concentrations of ice and to operate dependably under the most adverse conditions.

For a premium quality switch capable of long, reliable service, choose the Type WAG.

SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

IN CANADA: Dominion Cutout Co., Ltd., Toronto

Line relocation



need not be costly

Not, that is, when work can be completed during regular hours and without interrupting service. And many utilities are doing just that—paring the high cost of line relocation and other maintenance and repair needs—with versatile Electro-Mobile generating units.

For example, a 500 kw trailer like the one shown here can travel most anywhere, pick up a load in minutes. Crews can do their work faster, at lower cost, and all the while *normal service* is maintained.

Further, these units can be utilized as an immediate source of emergency power. Their quick mobility can provide the means to continued service, and continued good public relations.

The economies of Electro-Mobile Power have been demonstrated on many utility applications. Why not ask your Electro-Motive representative to outline briefly ways these trailer units can help improve service and lower costs for your system?

1000 kw units for use on sidings or placed on piers for semi-permanent use.

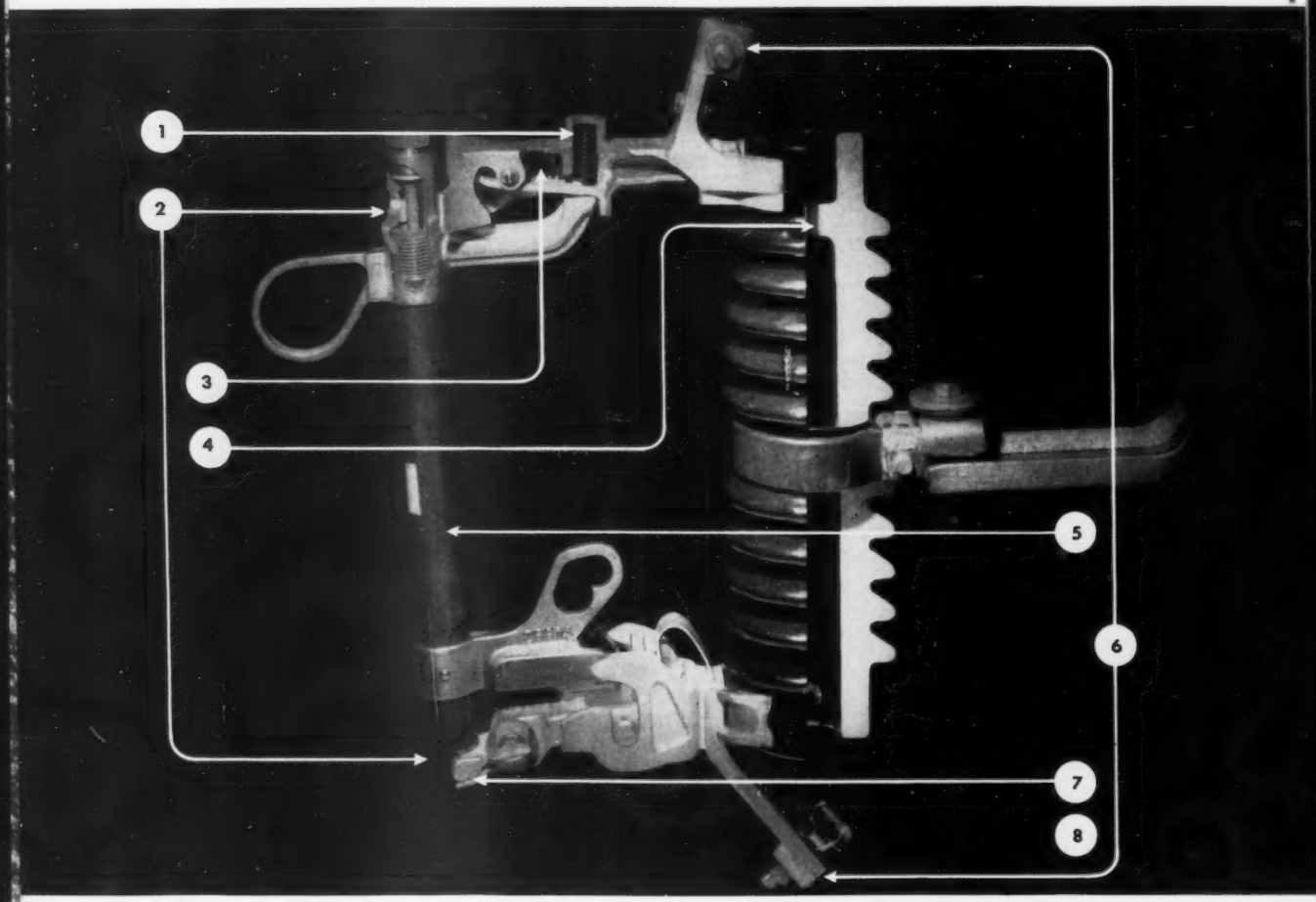
500 kw units offer excellent mobility for many temporary applications.

LIVE BETTER ELECTRICALLY

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS
LA GRANGE, ILLINOIS
Sales offices in Chicago, New York, St. Louis, San Francisco
In Canada: General Motors Diesel Limited, London, Ontario

For full range fault protection

Here, in this cutaway photograph, you can see some of the reasons why the Kearney Extra Heavy Duty Type G Cutout provides such full dependability on high, medium and low current interruption. Look over these design features and make a note to ask your Kearney representative about each one on his next call.



1. Full Floating Contact—stainless steel spring absorbs upward thrust, maintains contact pressure until arc is extinguished.
2. Gas Vents—double vent action minimizes internal gas pressure.
3. Horizontal Stainless Steel Spring—helps absorb recoil during fault interruption, takes shock when closing cartridge.
4. Insulator—designed for strength and lightness, barrier prevents internal leakage.
5. Cartridge—½" bore permits interruption of low faults; extra strength tube withstands pressure of high currents; accepts universal fuse links; no need for adaptors and other gadgets.
6. Terminals, Plated T-Lug Design—for use with all types of conductors.
7. Flipper—whip action provides 4" travel in separating blown fuse link.
8. All live parts either non-ferrous or stainless steel.

JAMES R. KEARNEY CORPORATION General Offices: 4224-42 Clayton Ave., St. Louis 10, Mo.

IN THE WEST: for prompt service, contact Kearney's West Coast Distributor, **Maydwell and Hartzell, Inc.,**
Los Angeles • Seattle • Portland • San Francisco • Spokane • Phoenix.

. . . specify KEARNEY Type "G" Cutouts

Look beyond maximum fault current calculations when you examine protection requirements on your system. Experience tells you that in most locations you can expect low and medium as well as severe fault currents . . . and you'll want a cutout that can stand up under all these conditions.

The test data summarized (below), together with the field-proved record in all parts of the United States, means just one thing. When you specify Kearney Type G Cutouts you have specified full range fault protection.

High, Low and Medium Fault Tests—KEARNEY EHDG-781 Cutout

SPECIMENS: Production Line Cutouts and Cartridges.

OBJECTIVES:

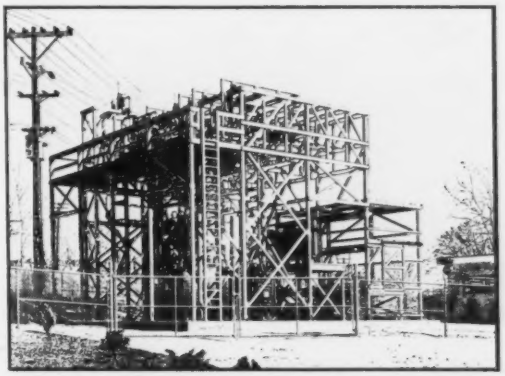
(1) To determine if Kearney EHDG Cutout will pass NEMA Extra Heavy Duty Interrupting Rating of 10,000 amperes at 7.8 KV, 20% power factor.

(2) To determine if Kearney EHDG Cutout will interrupt various low and medium currents from 15 to 800 amperes.

PROCEDURE:

(1) For the 10,000 amperes hi-range tests, the Kearney Test Substation was set up to deliver a maximum of 9,950 asymmetrical RMS amperes at 7.69 KV, 20% power factor. Four cutouts were tested using Kearney fuse links with 10 to 100 ampere rating.

(2) For the low and medium ranges, the Test Substation was set up to deliver 17 amperes at 99% power factor; 144 amperes, 432 amperes, 715 amperes at 20% power factor. Voltage in each case was 7.69 KV.



Kearney Substation Laboratory—

150,000 KVA transformer capacity, with back-up capacity of 445,000 KVA. For equipment testing under rigorous field conditions. Guarantees Kearney Certified Ratings to be proved performance ratings.

RESULTS: ***High Interrupting Capacity***

The Kearney EHDG Cutout interrupted its rated 10,000 amperes at 7.69 KV—20% power factor without difficulty. Each of four units cleared five shots *without a failure.*

Low and Medium Interrupting Capacity

Four units cleared the circuit without trouble. Each was shot five times at one of the following currents: 17, 144, 432 and 715, approximate.

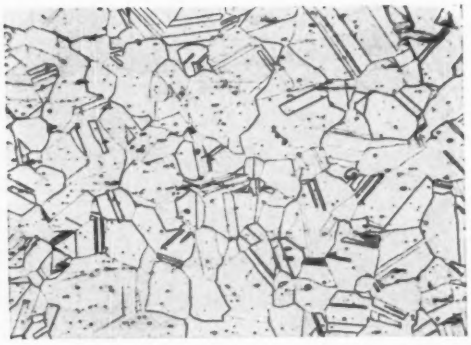
JRK-382W

For Better Construction . . . Safer Maintenance

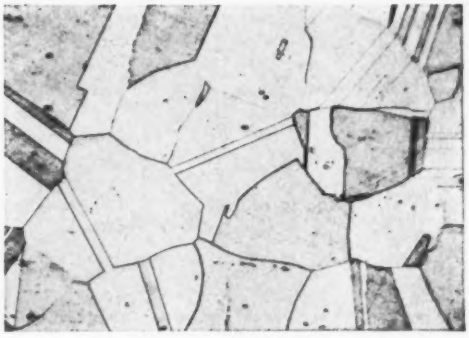
Specify KEARNEY Products

Plants at: ST. LOUIS • FAYETTEVILLE, ARK. • SHENANDOAH & CLARINDA, IA. • GUELPH, ONT., CAN.

4 Improvements in NICKEL-CHROME ALLOYS Now Obtainable from Driver-Harris Vacuum Melting Service



Polished and etched sample of Air Melted NICHROME V in annealed condition.*



Vacuum melted NICHROME V, annealed. Note that reduced inclusions result in much larger grain size for the same annealing treatment.

After many years of experience with vacuum melting programs, Driver-Harris now offers a complete vacuum melting service for almost all of the 132 special purpose alloys made by this company.

The specific benefits gained by vacuum melting in the production of nickel-chrome alloys are today clearly established. They are:

1. Much closer control of analysis—particularly in alloying with the highly reactive elements, Titanium, Aluminum, Columbium, Calcium, and Zirconium. The normally high affinity for nitrogen and oxygen these elements have is completely eliminated in vacuum melting, thereby opening new avenues in alloy production.

2. Great reduction in inclusions, especially oxides and nitrides, results in higher ductility and tensile properties. In fine wires, the improvement in properties is frequently so great that wire sizes may be reduced without sacrifice of strength. An example of the greatly improved microstructure is illustrated in the metallographs shown.

3. Complete elimination of gas, not from the surface only but from the entire mass. Alloys so produced are therefore more desirable in the manufacture of electron tubes.

4. General improvement in electronic, electrical, and mechanical properties to meet specifications. Because closer control of analysis is a primary advantage of vacuum melting, we can now achieve these specific improvements with remarkable certainty.

Almost all of the Driver-Harris Alloys now vacuum melted and processed under close physical and analytical control show improvement in one or more of the above ways. If you are seeking further improvements in the D-H Alloys you use, inquire now for information on how Driver Harris Vacuum Melting Service can help you. Address your inquiry to Dept. VMS.

*T.M. Reg. U.S. Pat. Off.

Driver-Harris Company*

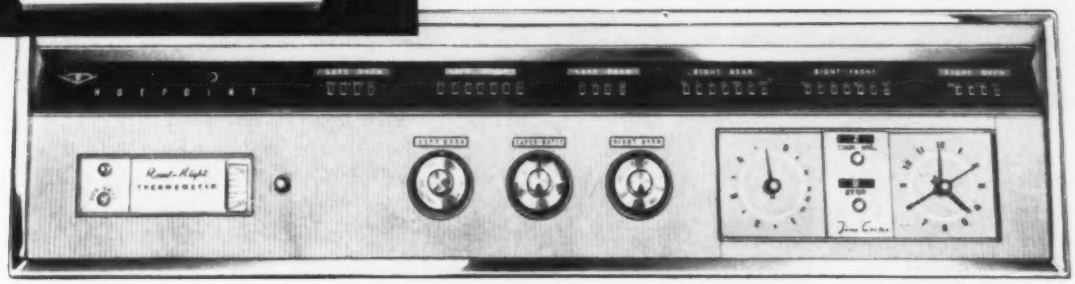
HARRISON, NEW JERSEY • BRANCHES: Chicago, Detroit, Cleveland, Louisville

Distributor: ANGUS-CAMPBELL, INC., Los Angeles, San Francisco • In Canada: The B. GREENING WIRE COMPANY, Ltd., Hamilton, Ontario

MAKERS OF THE MOST COMPLETE LINE OF ALLOYS FOR THE ELECTRICAL, ELECTRONIC, AND HEAT-TREATING INDUSTRIES

Hotpoint ELECTRIC RANGES

have the Difference
that builds load
and revenue...
automatically!



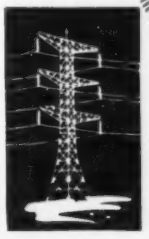
Hotpoint Electric Ranges help you build sales, load and revenue with all of the brilliant advances in quality, styling and completely automatic operation that make up the Hotpoint Difference. For example, the distinctive new control panel above provides automatic command of all surface and oven units—both time and temperature—at the touch of a button.

There's an exclusive new "thawer oven" that thaws frozen foods faster, doubles as a surface baking unit. And a new "touch open" storage drawer that glides out in response to a touch of the toe or hand. An exclusive musical meat thermometer, controlled with one simple setting, plays an appropriate tune — "Tenderly" — when the roast or fowl is done just right.

These imaginative, yet practical advantages are just a few samples of the sale-exciting features offered by the dramatic Hotpoint Difference. It's the Difference that will boost your electric range sales—and make a profitable difference in building future load and revenue.

Ask your Hotpoint Distributor to show you the Hotpoint Difference in the 5 NEW 39-inch models and the 3 NEW 30-inch models for 1958!

LIVE BETTER ELECTRICALLY



LOOK FOR THAT Hotpoint DIFFERENCE

(your customers do!)

ALCOA ANNOUNCES 62% CONDUCTIVITY FOR ALUMINUM CONDUCTORS

CONDUCTIVITY GUARANTEED—All difficulties and technicalities involved in supplying this new high-quality conductor have already been worked out. Right now, we are shipping redraw rod and conductor with minimum guaranteed conductivity of 62% IACS (International Annealed Copper Standard).

NO DECREASE IN TENSILE STRENGTH—Users of Alcoa® Aluminum Conductors will have to make no adjustments to compensate for changes in physical characteristics of this new high-conductivity conductor. There has been no downward revision in tensile strengths or mechanical properties of Alcoa redraw rods or conductors.

NO INCREASE IN COST—This remarkable new development in electrical technology is offered to the industry at no increase in cost over EC grades of conductor formerly supplied.

WHAT THIS MEANS TO YOU—The advantage in using 62% aluminum conductor can be computed as an increase in the conductivity of the conductor. Assuming the following conditions, here is a rather favorable example based on the capitalization factor:

1,113,000 cm 61 strand aluminum Weight = 1.045 lbs per foot Peak load current = 600 amps
Line losses = $0.005 per kwh Load factor = 50% Avg. operating temp. = 50°C
Interest rate on investment = 4% Amortization period = 30 years
For 61% conductivity $r_a = 0.0954\Omega$/mi. $P_L = 1^2 r_a = 600^2 \times .0954 = 34.34$ kw per conductor mile
From Section 13-1 *Standard Handbook for Electrical Engineers*, curve of annual energy loss for given peak load at various load factors.

Energy loss = $34.34 \times 2650 = 91{,}000$ kwh

Annual cost of losses = $91{,}000 \times .005 = \$455$ per conductor mile

For 62% conductivity $r_a = 0.0939\Omega$/mi.
Therefore, annual cost of losses = $447.85 per conductor mile
Annual savings = $455.00 − $447.85 = $7.15 per conductor mile

$$\text{Present value of benefits} = C\frac{1-(1+i)^{-n}}{i}$$ where i = interest rate, n = amortization period, C = annual savings

$$\text{Present worth of benefits} = 7.15\frac{1-(1+.04)^{-30}}{.04} = \$123.60 \text{ per conductor mile}$$

Converting to a per-pound value

$$\text{Present value} = \frac{123.60}{5280 \times 1.045} = \$0.0224 \text{ per lb}$$

This means one could afford to pay up to 2.24 cents per-pound premium for 62% conductivity aluminum conductor based on the annual benefits received.

Or, on the other hand, if you're a skeptic and not particularly concerned with the future, consider that one merely wants to buy a conductor of a given resistance. If the price of 1,113,000 cm 61% conductivity is $0.3902 per lb, the resistance equivalent 62% conductivity conductor yields a benefit of $62/61 \times .3902$ or $0.3967 per pound.

This means, of course, that the 62% conductivity conductor represents a saving of $0.0065 per pound.

ALCOA ALUMINUM
ELECTRICAL CONDUCTORS AND ACCESSORIES
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value

"ALCOA THEATRE"
Exciting Adventure, Alternate Monday Evenings

NEW FROM VICTOR!

NO. 961 FOGBOWL SUSPENSION

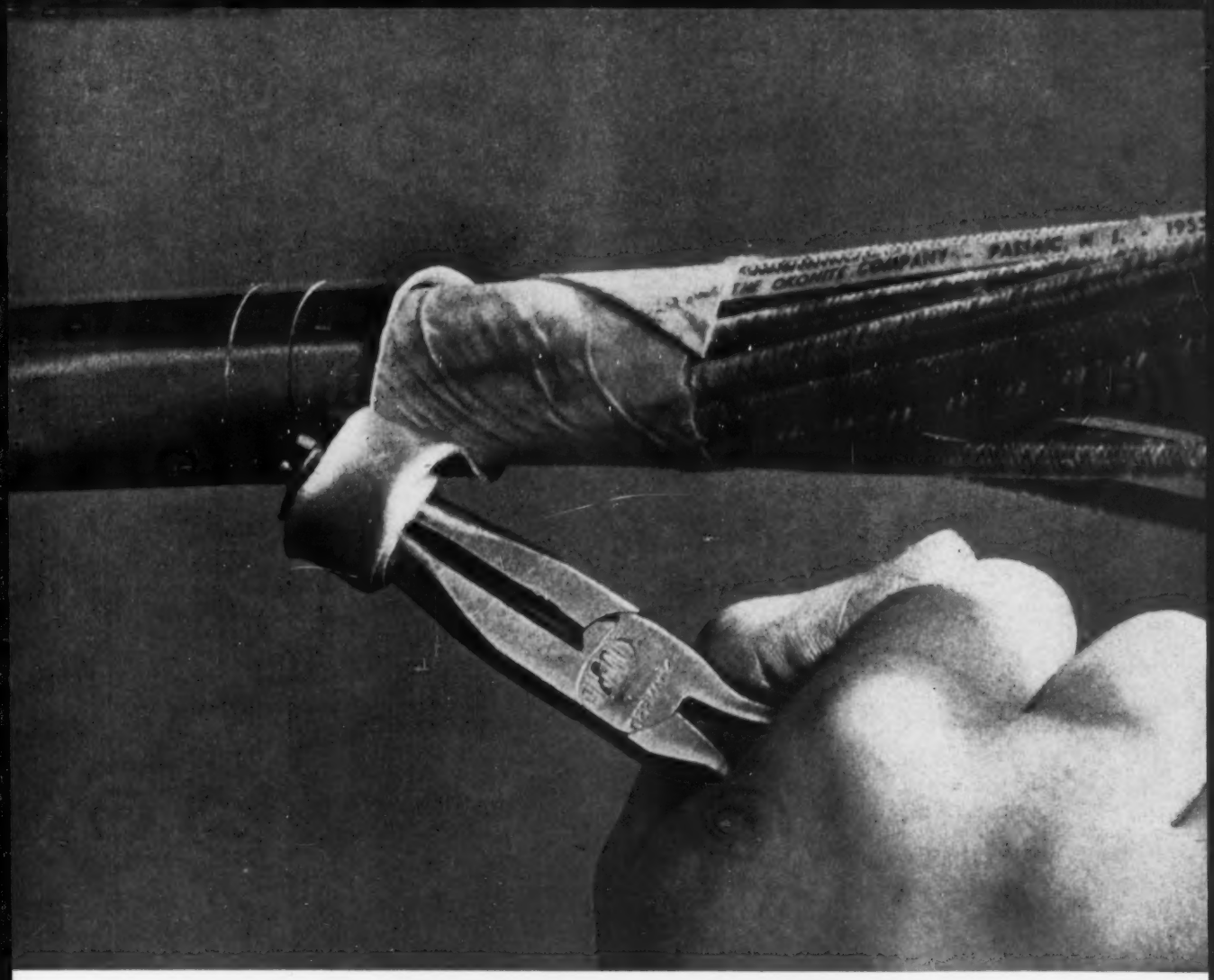
Specially designed for fog and smog contaminated areas, this brand new product of VICTOR research was created to satisfy a critical need. The new No. 961 suspension has the *lowest* leakage current and the *lowest* radio interference level of any other type or make of fogbowl suspension insulator used in contaminated areas.

Low surge and leakage currents contribute to many desirable advantages of this insulator—particularly the elimination of wood cross-arm burning. These exceptional features have been proved not only in VICTOR'S own electrical laboratory, but by extensive service on lines in locations where contamination is a serious hazard.

If your service depends on protection against fog, smog and industrial contamination, here is your answer—VICTOR'S new No. 961 Fogbowl Suspension. You can't buy better—at any price!

VICTOR INSULATORS DIVISION

I-T-E CIRCUIT BREAKER CO., INC. • VICTOR, N.Y.



ALUMINUM-SHEATHED CABLES

...light ...strong ...smaller diameter ...easy to install and terminate

A seamless aluminum sheath over Okonite cables provides a durable, conduit-type covering of high tensile strength. Yet this aluminum sheath is easily worked with standard conduit tools. It can be bent around obstructions . . . terminated at boxes, transformers, and the like . . . trained in trays . . . or supported by conventional brackets and cable clamps. Standard fittings are available. This low-cost alternate to rigid conduit is available with virtually any Okonite insulation such as rubber, plastic or varnished cambric.

Here are some important benefits of Okonite's aluminum-sheathed cables:

Reduced diameter and lighter weight.

Impervious barrier to liquids and vapors.

Excellent flame resistance.

Costs less than regular conduit installations.

Great mechanical strength, yet easily worked.

For complete data on Okotherm-insulated (silicone rubber compound) aluminum-sheathed cable for use in high ambients up to 200C (392F), contact your Okonite representative or write for Bulletin WE-1088A, The Okonite Company, Passaic, N. J. 4742

where there's electrical power . . . there's **OKONITE CABLE**

In transit . . .
On the ground . . .
And in the trench . . . **CUTTING UNDERGROUND**

COSTS WITH OCT-O-DUCT IS AS SIMPLE AS 1-2-3

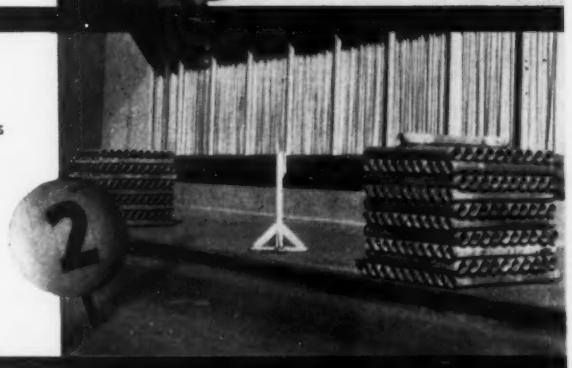
When you study duct installation costs, you can easily see that Soapstone OCT-O-DUCT saves you time, money, space and labor from delivery to laying. The pictures tell part of the story. The only way to get the *full* savings story is to try OCT-O-DUCT on *your* next job.

1

1. Steel-strapped, flat-sided OCT-O-DUCT with its convenient 4-foot lengths is easy to handle with regular lift trucks. Bundles may be spotted along the trench site exactly where needed.

2

2. On busy city streets, OCT-O-DUCT stacks up, safely and out of the way for quick availability, reduced handling costs, less likelihood of tampering and breakage.



3

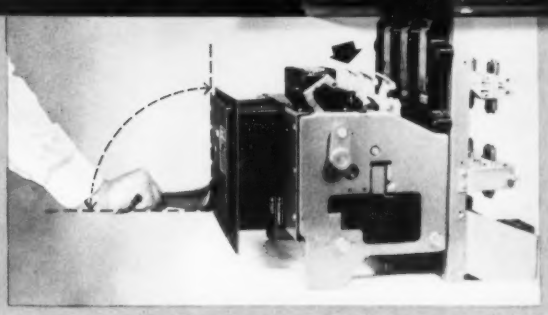
3. In the trench, OCT-O-DUCT reduces trench size and saves concrete and spacer cost, may be laid without spacers. New Type II OCT-O-DUCT is designed for direct burial — no encasement. One man in the trench and one man handing duct down is the normal crew size.

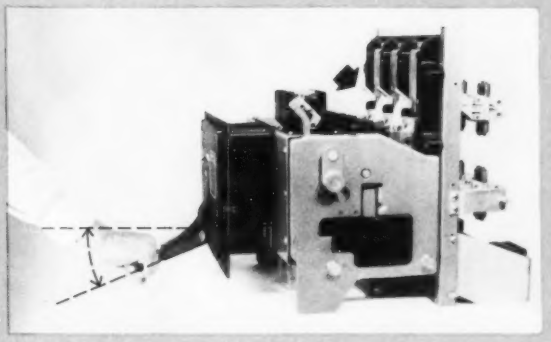
The many time- and work-saving features of Soapstone OCT-O-DUCT and full information on the sizes, bends and accessories available from this 30-year-old Company are contained in our catalog. For your FREE copy, drop us a note on your letterhead.

SOAPSTONE DUCT COMPANY
3895 BEACH STREET • OAKLAND 8, CALIFORNIA

DISTRIBUTED IN THE WEST BY
MAYDWELL & HARTZELL, INC.
SAN FRANCISCO, LOS ANGELES, SAN DIEGO,
PHOENIX, PORTLAND, SEATTLE, SPOKANE

I-T-E new K-Line of low voltage switchgear represents the first major advance in this type of equipment in 13 years. This completely new design offers greatly increased safety and operating efficiency, is available in three frame size ratings: 225, 600 and 1600 amp continuous at 600 v alternating current.





Quick-make closure of contacts on manually operated circuit breakers is provided by spring action. The first 90% of the pulldown handle travel loads the springs, the last 10% releases the stored energy and closes the contacts. No teasing is possible.

I-T-E announces sweeping design advances in new line of low voltage power circuit breakers and switchgear

- First quick-make closure of contacts
- First closed-door racking of circuit breakers to any position
- First expanded range overcurrent trip device
- 4-high stacking of 600 amp frame size circuit breakers
- Subassembly construction of circuit breakers & accessories

Quick-make manual closure eliminates damaging arcing, greatly increases life of contacts and circuit breaker—contacts cannot be teased together, breaker cannot be destroyed by careless closing against a major fault.

Quick-make closure, formerly available only on electrically operated circuit breakers, now is a standard feature of all manually operated breakers in the new I-T-E K-Line.

A manually charged stored energy mechanism, powerful enough to close the contacts safely against a full short circuit, provides the manual quick-make action. The first 90% of travel of the new pulldown handle charges a set of springs, the last 10% of travel releases the stored energy and closes the contacts—breaker life and operator safety do not depend on the brawn and brain of the operator. Contacts cannot be teased together, the closing action is fast and positive.

Electrically operated models in the K-Line have an actuating motor in addition to the basic mechanism. This motor-driven, stored energy system requires only 10 amp from a simple power source, compared to as much as 160 amp by comparable solenoid mechanisms. Energy for closing is prestored by the new K-Line circuit breakers in 2 seconds. Closing time is 5 cycles.

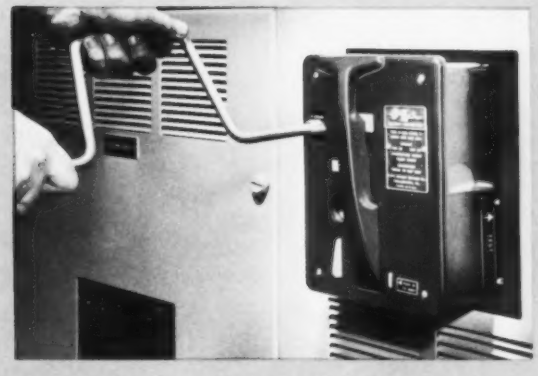
Closed-door drawout keeps circuit breakers clean and aisles uncluttered, promotes operator safety

This exclusive I-T-E feature permits racking of breaker into connected, test and disconnected positions without opening the door of the breaker compartment. It facilitates inspection, testing and maintenance. Blocked circuits are easy to identify. It keeps circuit breakers clean even in dust and dirt-laden atmospheres. It keeps aisles uncluttered and clear of compartment doors. It promotes personnel safety.

A lift shutter, which permits insertion of the racking crank that moves the breaker, can be padlocked in connected, test or disconnected position to guarantee complete safety. This shutter cannot be lifted while the circuit breaker is closed. Interlocking also prevents closing of the breaker while the shutter is lifted.

The extendible escutcheon slides through the compartment door while a dust seal surrounding the escutcheon is held in place by the door.

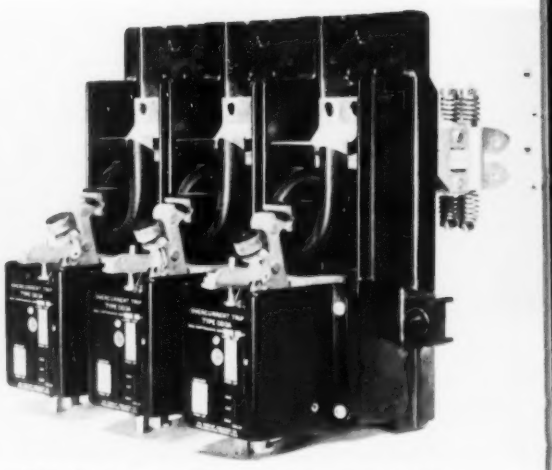
In addition to affording closed-door drawout, the new K-Line of switchgear is smaller than any comparable design. The reduced size of the circuit breakers permits 4-high stacking of 600 amp breakers. And unitized construction reduces the switchgear to three basic components —the breaker, the enclosure, and a cradle on which the circuit breaker rolls for drawout.



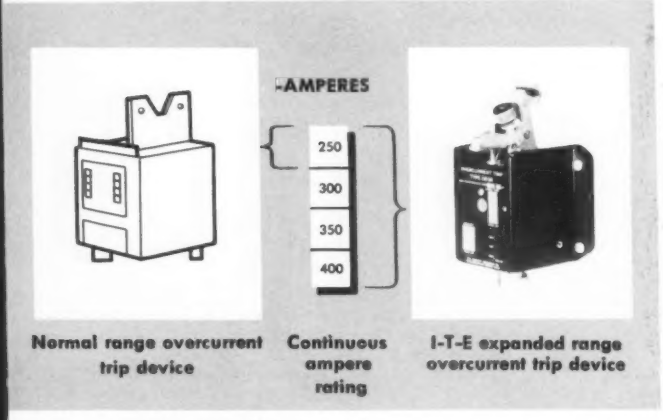
Exclusive closed-door drawout is illustrated in this series of photographs. Photo 1 shows shutter lifted and racking crank inserted. Photo 2 shows circuit breaker in connected position. Photo 3 shows breaker in test position. Photo 4 shows breaker in disconnected position.

New overcurrent trip arrangement permits use of each trip over wider range of continuous load conditions

Accessible trips, on both manual and electrical types, provide new ease of adjustment. Adjustment, a difficult job at best on previous electrical types, can now be made in a matter of seconds.



Common molding holds all three trips for this 600 amp K-Line circuit breaker. Can be replaced in a fraction of time required for changing the individual trips on comparable lines.



This table indicates a sample grouping of ratings for the new K-Line circuit breakers. Only 9 trip units now cover the range of continuous current ratings as against 23 formerly required.

Trip flexibility is an important feature of the K-Line. Only 9 trip units now cover the complete range of continuous current ratings—15 to 1600 amp—as against 23 formerly required. Last-minute changes in load capacity can be satisfied in many instances with the existing trip unit as a result of the expanded range of trip settings.

This feature, plus easy adjustment of trip devices and quick change in the field, is particularly significant in meeting constantly expanding load requirements. Trip units are mounted on a one-piece base. Trip units are changed from the rear and in a fraction of the time formerly required.

For the complete story of the I-T-E K-Line of circuit breakers and switchgear, see your local I-T-E representative. Or write us for Bulletin 6004C. I-T-E CIRCUIT BREAKER COMPANY, Switchgear Division, 19th & Hamilton Sts., Philadelphia 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY

19TH AND HAMILTON STREETS, PHILADELPHIA 30, PENNSYLVANIA

YOUNGSTOWN "BUCKEYE" CONDUIT

. . . Provides Lifetime Wiring Protection For Frank Lloyd Wright's Modernistic Price Tower

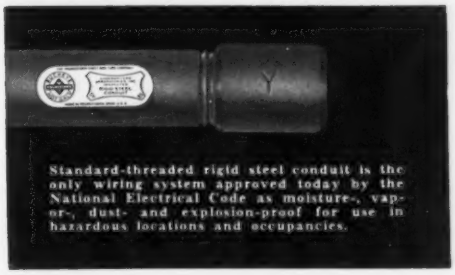
At Bartlesville, Okla., the H. C. Price Co.—veteran oil and gas pipeline construction firm — recently opened their beautiful, new cantilever-design Price Tower. Containing both offices and residential apartments, this 19-story, fully air-conditioned structure uses Youngstown "Buckeye" full-weight rigid steel conduit for protection of its important electrical wiring system from damaging elements such as water, moisture, vapor, dirt and dust.

Field reports across-the-nation state: "Youngstown's 'Buckeye' Conduit is easier to bend—easier to fish wires through and, due to its superior corrosion resistance, affords a much longer trouble-free service life."

Leading distributors in every industrial and electrical market are ready to serve you quickly and efficiently from their ample stocks of Youngstown "Buckeye" Conduit. They're as near as your phone—why not call today?

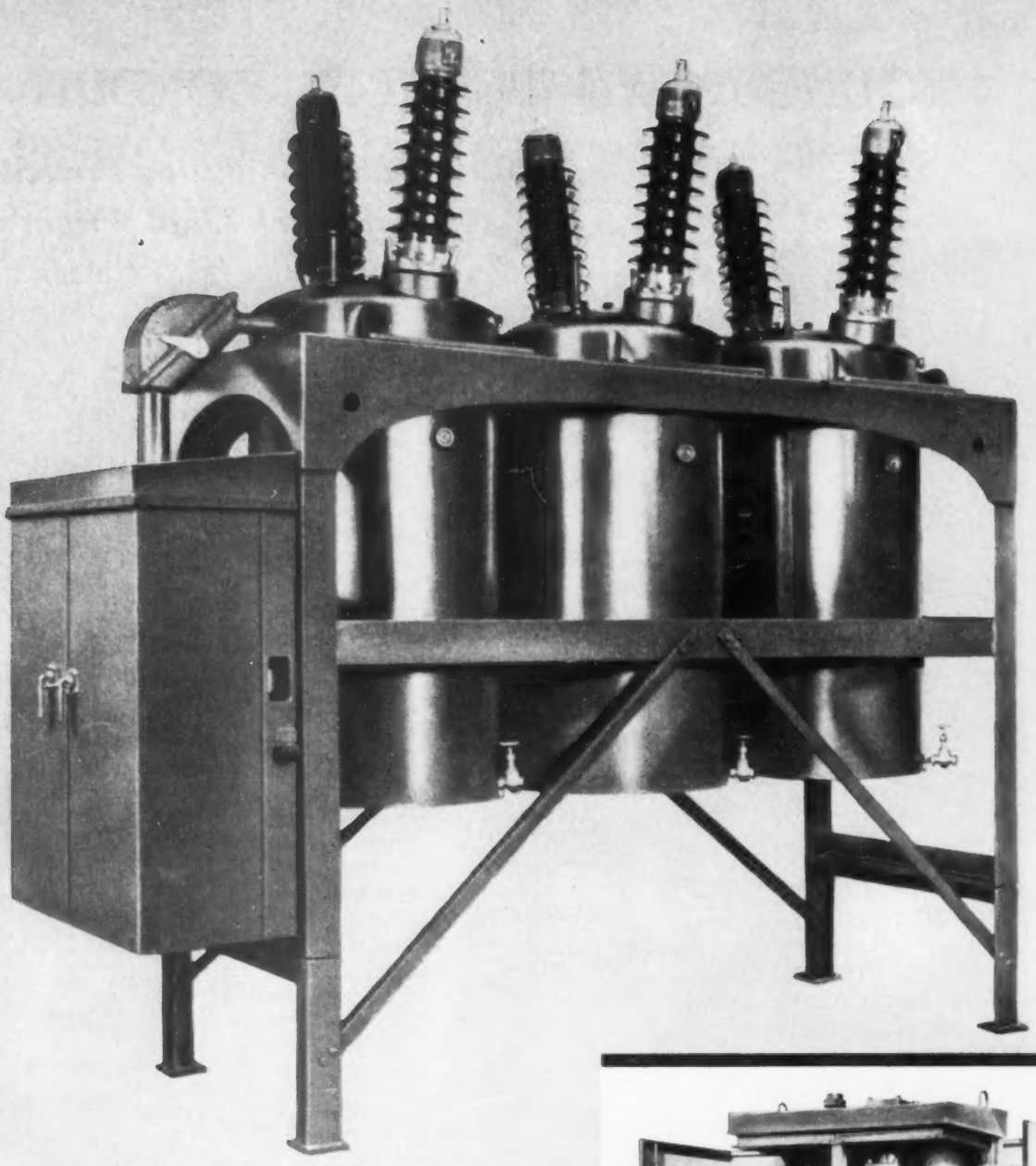
QUALITY YOUNGSTOWN SERVICE

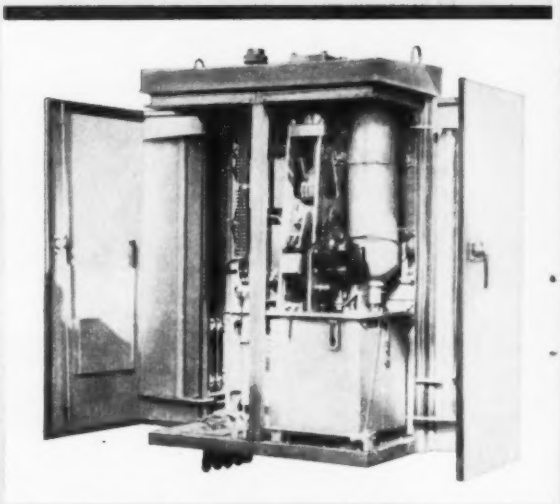
Price Tower, Bartlesville, Okla.
Owner: H. C. Price Co.
Architect: Frank Lloyd Wright
General Contractor: Culwell Construction Co., Oklahoma City, Okla.
Electrical Contractor: Industrial Electric Co., Oklahoma City, Okla.
Conduit Supplier: Westinghouse Electric Supply Co., Oklahoma City, Okla.



Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities





TYPE OA HYDRAULIC OPERATOR. Safe, dependable operation—ultra rapid response—smooth, shock-free performance—freedom from corrosion—100% trip-free under *all* conditions.

Introducing

THE NEW FEDERAL PACIFIC

TYPE AF

OIL CIRCUIT BREAKER

..Designed to Interrupt High Current Faults in 23, 34.5, 46 & 69 KV applications

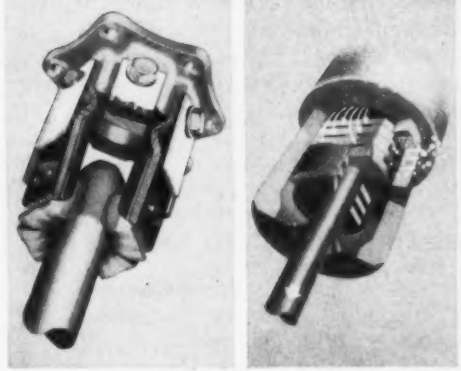
Compact...rugged...unrivaled in dependability—Federal Pacific's new high-capacity, frame-mounted Oil Circuit Breakers embody the most advanced design features to provide unmatched performance and reliability. Employing a rugged, thoroughly-tested drop-bar contact structure, the new type AF is equipped with standard ASA bushings. Two bushing-type current transformers per bushing can be provided where necessary.

Powered by the advanced type OA hydraulic mechanism, they give fast, shock-free opening and closing...and are *100% trip-free under all conditions.* The mechanical linkage is characterized by a highly efficient straight-line-drive of greatly simplified design. Subjected to the most exhaustive testing procedure—the ability of the new breaker to withstand high-current fault interruptions has been thoroughly proved. For full details, call your nearest Federal Pacific engineering representative or write for Booklet #4-540: Pacific Switchgear Division, 5815 Third Street, San Francisco 24, Cal.

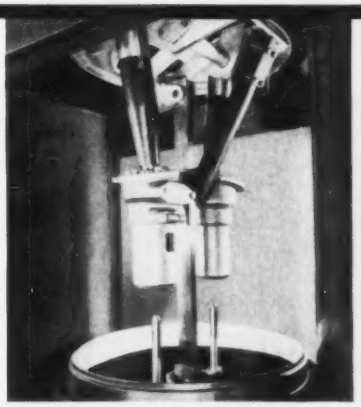
FEDERAL PACIFIC ELECTRIC COMPANY
Main Offices: 50 Paris Street, Newark, New Jersey

FEDERAL FPE PACIFIC

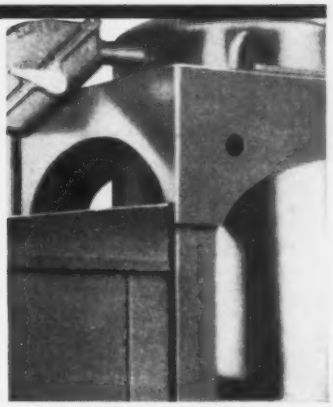
Better Products to Control Electricity



RAPID ARC EXTINCTION. Oil injection into hot gas bubble accelerates condensation and cooling ...results in high dielectric recovery rate...prevents arc re-ignition at proper gap distance—with minimum pressure build-up and erosion.



STURDY DROP-BAR CONSTRUCTION. Minimum number of components; dependable, simplified mechanical linkage; convenient adjustment; efficient straight-line-drive principle of operation; instant response; minimum space requirements.



RIGID FRAME DESIGN. Functionally designed frame with extra-strong joint construction. Inverted channel upper frame member for maximum strength and transformer lead protection.

A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SPECIAL SERIES

Pay Of College Teachers... Where The Russians Are The Capitalists

This editorial deals with a simple question about college faculty salaries: Which country pays its teachers better, Russia or the United States? It's a good question, with a sadly embarrassing answer.

That American college and university teachers are underpaid is not a novel observation. But what has happened to the economic status of their profession can be put in more candid terms. **As far as financial incentives are concerned, we have virtually socialized the academic profession.** Teaching has become such a poorly paid career, with so little prospect of material reward for outstanding performance, that it simply does not attract enough highly qualified young men and women.

Ironically, the Soviet Union has deliberately and successfully used capitalist incentives to improve its educational system. Although the Russians show an utter disregard of civil liberties, they pay their teachers well and confer on them all the prestige and privileges the Soviet society can offer. Russian professors, together with party officials and scientists, have become the privileged upper class of a supposedly classless society.

Incentives To Be A Teacher

To be a college teacher requires high intellectual competence and long, sometimes costly, formal training. Aside from the appeal of academic life, what incentive does college teaching offer bright young men and women?

In the U. S., the average faculty salary is little more than the average income of industrial workers. According to the National Education Association, the average faculty salary is about $5,240. College instructors receive $4,100, associate professors $5,730 and full professors $7,100. The average income of U. S. factory workers in 1956 was $4,580.

Actually, workers in many industries — steel, automobile and petroleum, for example—earn more on the average than college teachers. And skilled workers often earn more than full professors at some of our colleges and universities.

In Russia, on the other hand, the young Soviet graduate can see that it pays — and pays very well — to choose teaching as a career. The head of a department in a Russian university can command a salary of about 6,000 rubles a month.* This is about eight times the income of the average Russian worker, who earns 750 rubles a month.

The Russian professor comes off very well in terms of what his income will buy. It has been estimated that, based on Soviet consumption patterns, 6,000 rubles a month is worth about $7,200 a year — or higher than the average professor's salary in the U. S. Of course, it is difficult to compare living standards in two countries as different as the U. S. and Russia. But particularly in the field of science — where the salaries can run to 15,000 or more rubles a month — it is clear that the Soviet professor enjoys a higher real income than that offered his American counterpart by a much more prosperous economy.

Incentives To Be A GOOD Teacher

Russia also offers much higher premiums than the U. S. to those who attain distinction in teaching. Teachers at the university level earn significantly more than teachers in high schools, and university instructors can look forward to a sharply progressive rise in earning power as they

* *Soviet Education for Science and Technology* by Alexander Korol of the M.I.T. Center for International Studies.

How Faculty Salaries Compare With Industrial Wages
(Worker's Wage In Each Country = 100)

*Sources: Center for International Studies, M.I.T.; National Education Association; McGraw-Hill Department of Economics

advance to higher positions. The spread between the income of a full professor and the lowest academic position is greater than fifteen to one. In addition, full professors can earn a healthy bonus if they are elected to membership in the Russian Academy of Sciences.

In the U. S., by contrast, full professors on the average earn less than twice as much as beginning instructors. And many college professors earn less than public school teachers in large cities. Even a full professor's pay does not compare with earnings in other professions or in positions in industry requiring similar training. The point was well summarized in a recent speech by Marion B. Folsom, Secretary of Health, Education and Welfare: "It is nothing short of a national disgrace that we are discouraging people who want to teach by offering salaries that are far below the levels justified by their training and far below the levels which others are willing to pay."

Our colleges and universities, as well as our teachers, find themselves in a serious predicament. Faced with a shortage of both funds and teachers, they cannot reward distinguished performances. Limited resources for salary increases have gone predominantly to the lower ranks, so that an adequate number of teachers could be retained. Meanwhile, potentially fine teachers are being siphoned off into better paid occupations.

The shabby treatment of our teachers threatens to undermine, not only our educational standards, but our free enterprise system itself. There is the recent example of a liberal arts college which discovered that five of its graduating seniors were being offered starting salaries higher than those paid any of their professors. It would be surprising if experiences like this did not place a strain on the enthusiasm with which these professors deal with some key aspects of American capitalism.

Also important is the role education is playing in the cold war with the Soviet Union. The Russians have made great strides in raising the quality of their education — particularly in science and engineering. Both the number and the technical calibre of their graduates are impressive, as recent Soviet achievements testify. These successes owe much to the generous economic treatment the Russians have given their teaching profession.

A Standard For Faculty Pay

Earlier editorials in this series have outlined various ways American business can help relieve the financial plight of our colleges and universities. They have suggested that private contributions to higher education should average at least $400 million a year over the next ten years if faculty salaries are to be raised to adequate levels and our colleges are to be able to meet increasing operating costs.

Another standard for raising faculty salaries proposed by an American businessman is this: "When a teacher's income gets up to a point where you will suggest to your boy that he ought to give some thought to teaching as a profession, then we may be approaching the right figure."

Russia clearly has set her teaching salaries well above the "right" figure. We are nowhere near it. What this adds up to is that the Communists — not we — have become the shrewd capitalists in the vital field of education.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw
PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

ELECTRA'S HUSBAND

Random Thoughts

Maybe the preprandial martini before New Year's dinner did it, but as I was relaxing in the easy chair while Electra put the finishing touches on the spread I got to thinking:

About Ike—his illness couldn't have come at a more unpropitious time for the nation and for the free world. No matter how swift and complete his recovery, his physicians will undoubtedly make him watch his health and conserve his strength to a much greater degree than heretofore. That means that still more of the government functioning will be controlled by caucus and committee. Could be deadly in a world that is just beginning to get accommodated to the thought of the satellite age.

And speaking of satellites, there is nothing in the wind yet to indicate that concerted efforts have replaced the "buckshot" program—a program in which rivalries, jealousies and lack of firm leadership have riddled the basic objective. Ever since Sputnik I, the Washington gobbledegook mills are the only things that are running on a crash basis. Hearst newspapers' George Dixon made a delightful summary: "The preponderance of handouts convey the impression that our major crash programs now are built-in contradictions; planned consternations; carefully calculated confusion; and massive irresolution."

Incidentally, has anyone ever heard just who *is* supposed to head up the missile program?

That reminds me that one of my friends whom I respect as a pretty sound thinker made a sweeping indictment about the American approach to science. He pointed out, that with the exception of medicine, U. S. scientists have made no major breakthroughs on any of the important scientific fronts in the past 25 years. When challenged, he pointed out that the atomic bomb was the concept of a scientist educated under the European educational disciplines and that it was developed under the guidance of an Italian-educated physicist. The Germans had operational jet engines before we realized they were anything more than a scientific curiosity. The British invented the radar systems that we know today and rocketry was a science in Europe when it was still a tool of the science fiction writers in the U. S. He stated flatly that American scientific achievement fed off the backlog of pure scientific research that has been done in Europe for decades.

Maybe all this is true but the obverse side of the coin is that our research and development efforts have been directed toward the application of science to the humanities and the improvement of living standards. Such an orientation may be impractical in a world where power, pressure and propaganda seem to have taken over. Just because we've been more preoccupied with the development of an electronic oven rather than an electronic guided missile system is no reason to be ashamed or particularly alarmed. It's a rather nice feeling to know that science here has been directed basically to peaceful applications. The only question now is whether or not we can (or should) shift to an all-out scientific effort in the other direction.

And if we should, how are we going to finance it?

That thought shifted my mental train to a new track. All of the things that apparently will have to be done are going to cost money. Are the American people now getting their money's worth out of the $130-odd billion that the tax collector abstracts from their pocketbook annually? How can this staggering amount of money be spent to get maximum life insurance for the population?

It reminds me of the story of the king who called his nobles together to ask them why, when taxes were so high, that so little eventually ended up in his treasury. As they sat around a long table discussing the matter inconclusively, one of the lesser, but bolder, spirits sitting far down along the table arose and said, "Sire, I believe I can demonstrate the principle involved." Whereupon he reached into the pitcher and picked up a piece of ice and asked his neighbors to pass it along to the king.

The moral to that? Maybe we too have too many fingers handling the wherewithal to do the jobs that have to be done. Maybe the public is ready for the strong leadership that will say, "These are the things that must be done and these are the things that we can afford to do without." Maybe.

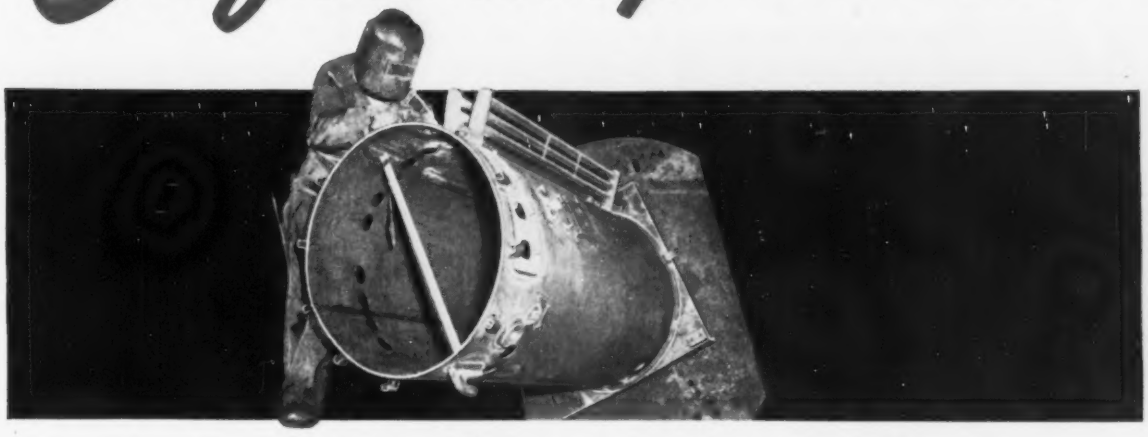
And speaking of some of the things that need to be done, more and more people are coming to the realization that the Russians aren't fooling when they say that their pool of scientific manpower is rapidly exceeding our own. The costs of education, particularly higher education, being what they are, there seems to be a swelling clamor for Uncle Sam to step in and plug the monetary gap. Leading educators are very chary (and rightly so) of letting the federal government into the act on the theory that the one who pays the bills may want to call the tune. But it was only the other day that one prominent educator talked about the possibility of dealing with the federal government "at arms' length." Wonder what the real difference between "arms' length" and the "camel's head under the tent" philosophy is?

The hard way to build up our educational plant is through private donations and endowments. The easy way is to let uncle do it. Wonder if the country is ready yet for doing things, not only in education, the hard way?

That set me to thinking that our generation pretty much has been addicted to doing things the easy way. We've probably been too self-indulgent, too kindhearted and too downright lazy to be really good citizens as a whole. Looks like it bought us a hatful of troubles. Wonder if we're strong enough to face up to them or whether we'll figure the easy way is to let the kids handle them?

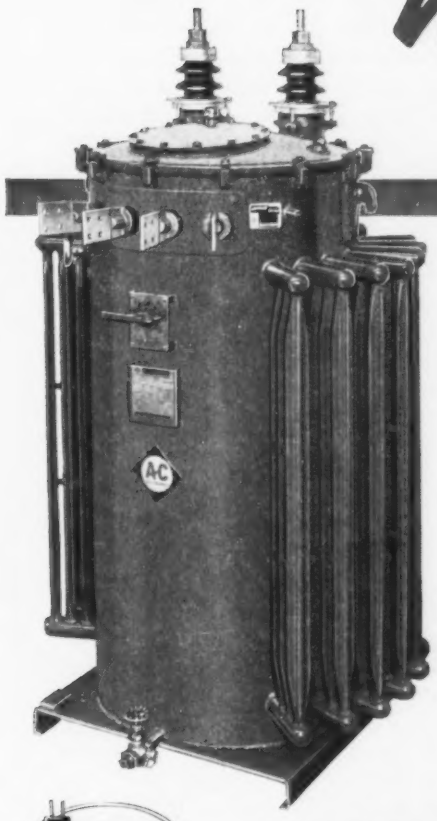
Just then Electra sang out from the kitchen, "Come and carve the turkey." Happy New Year to you, too!

Craftsmanship at Allis-Chalmers



Welding Skills

and Facilities Assure Longer Service, Less Maintenance



Another example of combining manual skills with advanced engineering and modern equipment at Allis-Chalmers is found in the tank welding line. Special tank positioners permit operators to use the down-hand method in electric arc welding. This results in better welding accuracy and quality, guarantees strong, oil-tight welds. Closely controlled welding temperatures, weld sizes and fillets calculated and specified by engineers, add assurance of quality craftsmanship — help explain why Allis-Chalmers distribution transformers last longer with far less maintenance.

All Tanks Pressure Tested

Before getting a stamp of approval, all tanks are pressure tested after the welding operations. The welds are dusted with chalk. Oil-filled tanks are then pressurized. The smallest leak is easily detected by oil staining the chalk.

For all the details of Craftsmanship in Allis-Chalmers distribution transformers, call your A-C representative, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

NATIONAL ELECTRICAL WEEK
FEB. 9-15, 1958

ALLIS-CHALMERS A-C ALLIS-CHALMERS

A-5558

editorial views

New Opportunity

ELECTRICAL maintenance is scheduled to assume a much greater role in the economics of production in the near future. Industrial plants, under the pressure of cost reduction, are becoming either more highly mechanized or fully automated. This in turn involves more complicated, more expensive and more elaborate production equipment. Such equipment must be kept operating at a very high load factor to yield a maximum return on the investment involved.

Much has been said and written concerning the need for continuity of electrical service to the modern industrial plant. Continuity of service of the equipment itself is just as important and requires a carefully engineered maintenance program that will minimize unscheduled outages. Many plants probably will not be able to afford the crew of specialists that may be necessary to service and maintain highly automated equipment. It might very well be that electrical contractors and electrical service organizations are being confronted with an entirely new business opportunity—that of providing programmed and specialized maintenance service for the thousands of smaller industries that will be adopting automated processes as rapidly as economics decree and finances permit.

New Look

EVEN better than good resolutions is concrete action aimed at improvement. With this issue, Electrical West inaugurates additions and changes to its publishing service which the staff hopes will make it a still better medium of communications for the growing, dynamic electrical industry of the West.

In this issue, you will note on page 104 the beginning of a new news format which is designed for faster reading and more comprehensive coverage of electrical happenings in the eleven Western states. This, of course, is in addition to the "Roundup" pages at the very beginning of the book, which highlight national and international items of electrical industry interest.

In mid-January each reader will receive the first mid-month industry news letter which will feature highlights in the news and is aimed at keeping the industry abreast of developments in between the regular issues. The addition of a mid-month news letter to Electrical West's publishing service is in keeping with the growth and importance of the electrical industry in this region. The editors hope that these changes will not only meet with the approval of its reader audience but will also make the publication still more essential as a means of industry communication and coordination—all to the end that Western electrical growth and development can be accelerated.

New Approach

THE Washington Water Power Co. is tackling the public relations problem in a most basic fashion. Literally it is making real friends of its customers by getting customers to know Washington Water Power people as neighbors.

The object of the program is to have every customer say, "Yes, I know a Washington Water Power Co. employee by the name of such and such." When queried recently, 65% of the company customers were able to identify a friend.

The friend-making campaign apparently has been accepted enthusiastically by Washington Water Power personnel. At least they increased the percentage of customers who had a WWP friend by 13% this year.

The theory behind the campaign is good. A friend can personalize a company as in no other way. Once a customer knows and likes someone from the Washington Water Power, that cus-

EW

tomer is more likely to be interested in the company affairs and its problems.

There are many in the industry who view with alarm the decreasing number of contacts that customers have with the electrical company. There never were too many of these contacts; but with the advent of the outside meter, the growing tendency to pay by check plus the abandonment of merchandising and the relinquishment of appliance servicing to other agencies, there's practically no reason for a customer to see anyone from the public service company. Making friends by being neighborly, through civic affairs and other ways might be just the way to reverse this trend toward impersonalized service.

New Challenge

A RESOUNDING commendation is due the Northern California Electrical Bureau for proving that strong promotional efforts pay off. The bureau's area of service is the same as that served electrically by Pacific Gas and Electric Co. The utility has developed a comprehensive and accurate system of collecting figures on appliance sales and these provide a measure of the effectiveness of the bureau's efforts.

Early in 1957 the Northern California Electrical Bureau stepped out with promotional efforts on a certain group of appliances. The resulting sales show substantial gains for these particular appliances in contrast to national losses for the same items. For example, in nine months freezer sales in northern California increased 11.6% while the national sales on that appliance decreased 7.7%. Electric ranges showed a 9.5% increase compared to a 12.8% decrease nationally. Water heaters likewise chalked up an 8.2% gain compared to a 27.9% loss nationally. The national figures are based on eight months' sales but this does not materially affect percentage comparison.

Another significant fact emanating from the sales figures concerns the dryer. The 1957 dryer campaign did not occur until October of this year. Dryer sales for the first nine months, without any campaign, are down in the northern California area but preliminary figures after the campaign show that the down trend has been reversed in the area.

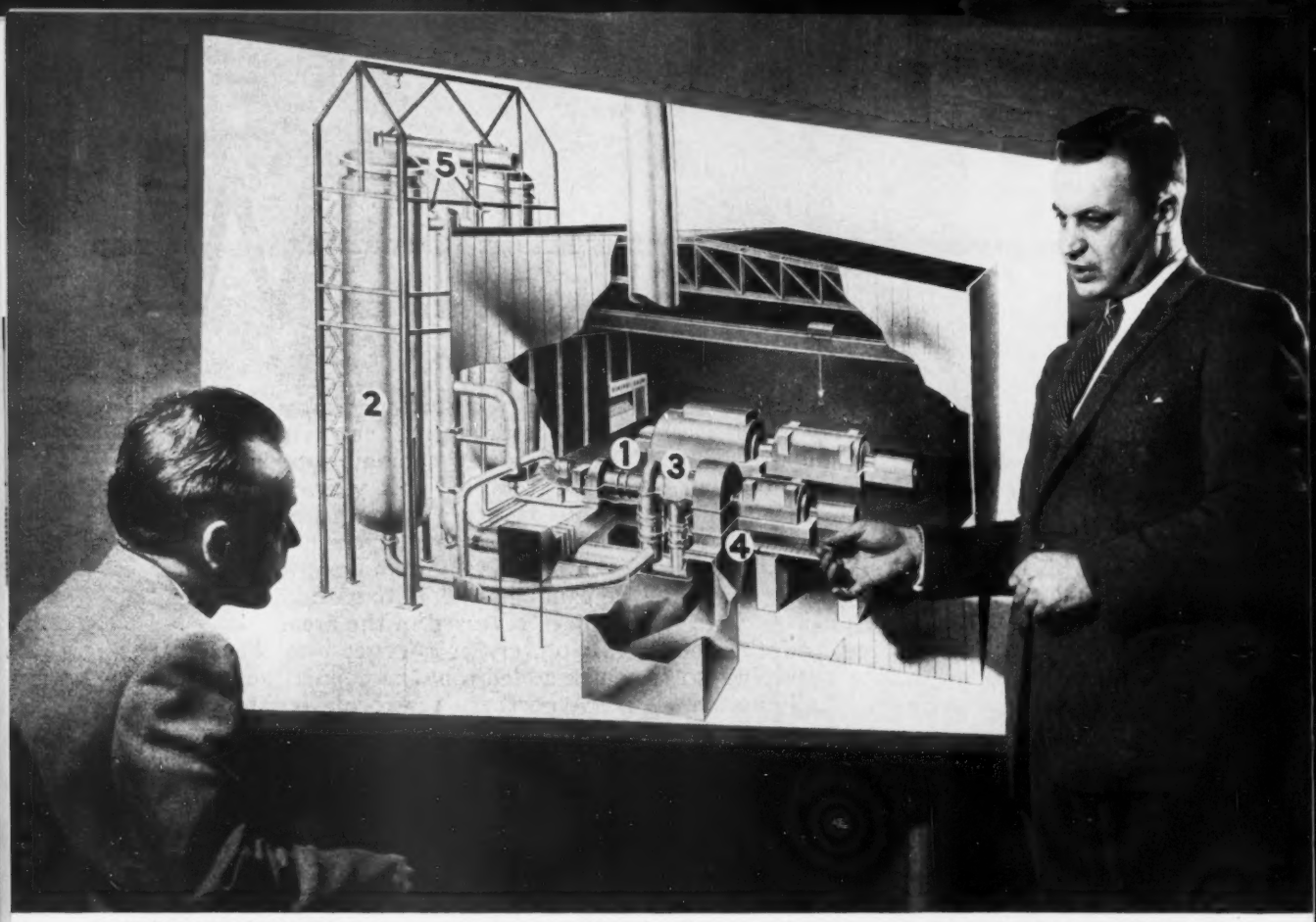
Before critics can get into the act, it can be added that the population growth in the northern California territory was 3.4% compared to 1.8% nationally. It will be noted that even though the growth in population was larger, it by no means accounts for the large differential in sales results.

It is seldom that such a clear-cut evaluation of promotion can be attained. It is also a challenge to anyone in the electrical industry who complains that customers can't be sold.

SIX pragmatic tests to apply to every demand for new or increased federal expenditures:

1. *Does the request fill a real need?*
2. *Is it a need which only government can supply?*
3. *Must the need be met by the federal government?*
4. *Will spending by the federal government meet the need to a degree to make it worth-while?*
5. *If it is an extension of an existing program, has the spending on this program been efficient?*
6. *Must the spending be done now?*

If those tests are applied, and the honest answers firmly acted upon, we'd see a startling drop in the federal budget.—J. Cameron Thomson, Committee for Economic Development.



COMBINED GAS-STEAM CYCLE begins as air enters compressor (1) and is discharged to boiler (2). From boiler, gas enters gas turbine (3), and exhausts (4) to economizer, stack gas cooler, and stack. Steam at (5) goes to steam turbine. The supercharged boiler design shown in the illustration above appears through courtesy of Foster Wheeler Corporation. Discussing economies of new combined-cycle power plant are General Electric's W. D. Marsh (left), Engineering Planning & Development Section, and H. A. Carlson, Gas Turbine Department.

General Electric announces 133,500 kw combined gas-steam cycle power plant

These benefits are expected:

- **6% lower heat rate**
- **reduced boiler weight and volume**
- **low plant investment**
- **faster plant start-up**

The combined gas-steam cycle power plant offers promise of major heat rate gains. In this respect, the combined-cycle plant is one of the most significant developments in the electric power generation field since the General Electric Company installed the first steam turbine-generator unit using the modern reheat cycle in 1950.

General Electric turbine engineers expect net station heat rate for this gas-fired, combined gas-steam cycle to be 9,413 Btu/kw-hr—with little or no increase in plant investment. This rate compares with 10,045 Btu/kw-hr for a conventional steam cycle using a similarly rated, tandem-compound, double flow unit of the same steam conditions.

Looking still further into the future, General Electric engineers expect operating experience with a gas-fired plant to help speed the adaption of the combined cycle to oil- and coal-fired plants. For more information on how your utility can achieve lower cost generation by applying this new plant, contact your General Electric Apparatus Sales Office, or request bulletin GER-1452 from General Electric, Section 301-372, Schenectady 5, N. Y.

LIVE BETTER ELECTRICALLY

MORE POWER TO AMERICA

GENERAL ELECTRIC

ELECTRICAL WEST SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U.S. VOL. 120 NO. 1 JANUARY 1958

The staff having studied, analyzed and interviewed to assess the current economic situation comes up with the conclusion . . .

Don't Sell 1958 Short!

"How is business going to be in 1958?" The answer is: "1958 will be a good business year, measured by practically every yardstick." Right now the economists are glibly talking about a rolling adjustment—which means that there are ups and downs in various segments of the economy with the "downs" predominating enough to cause a decline in many business indicators.

Props under the nation's economy are still exceedingly sturdy. Capital spending by private industry will probably be down from 5 to 7% over the record-breaking 1957 figure but even so it will be at a whopping $35 to $36 billion annual rate in '58. The McGraw-Hill annual survey of capital spending plans indicated that planned spending by business and industry would total $36 billion, 7% below the 1957 figure estimated as of November of last year. Heaviest hit by retrenchment in capital spending programs were the manufacturing industry (-16%), the mining industry (-18%), railroads (-27%). Electric and gas utilities, the petroleum industry and other transportation and communication companies all indicated increase in the 1958 budget over 1957.

Public and defense spending could reach peacetime peaks in 1958. As the year closed there were discernible pressures building up for an "all-out" attack along the missile front, which could push defense spending up as much as $2 billion. The highway program is now getting into high gear and could be a pump primer of the first magnitude should the economy need a real shot in the arm. The people have voted enough bonds in the past 12-month period to nearly double the rate of classroom construction—and school building continues to be a very strong part of the state and local government construction program.

Residential housing is firming up with gains made during the last quarter of '57 that will bring the year's total up to nearly 1,000,000 starts. Experts are predicting that slightly over a million new homes will be constructed in 1958.

Consumer income and consumer expenditures continue at a high level, although consumer buying late in the year, under the influences of layoffs and shorter work weeks, tended to be considerably more cautious.

Psychological Factors

The effect of psychological factors on the economy is mixed. Already mentioned is the tendency toward caution on the part of consumers when employment rolls turn downward and pay checks decrease through shorter hours and less overtime. The downward drift of the stock market, too, does not instill confidence when business decisions are being made. However, it is quite possible that investor attitude may be shifting from its former emphasis on capital growth to greater consideration for return on capital. And there's no denying that the squeeze on corporate profits is substantial.

Costs have been rising and prices have followed suit. A great many companies have discovered that a substantial growth in sales was not reflected in a similar growth in profits. Still higher price tags may not be the answer in view of increasing consumer buying resistance—as the auto industry may be finding out.

On the other hand, 1958 will be an election year and the incumbent administration undoubtedly will throw all of its resources of the government into play to keep the economy running in as high a gear as possible. As a matter of fact, there seems to be a consensus among statisticians that the present downtrend may be reversed by mid-1958. Their predictions, so they say, are based on considerably more than just hope.

Here in the West mixed economic factors likewise prevail. For example, cutbacks in the aircraft production industry, highly important in southern California and the Seattle areas, have contributed to a modest increase in over-all unemployment. At the same time the new emphasis on missiles and the associated electronic gear necessary to control them suggests that the latter industry will take up all of the slack and more within a relatively few months.

In the Pacific Northwest lumber and plywood have been hit by the drop in home building. The latter industry is showing encouraging signs of revival and as of September the backlog of unfilled orders was one-third above the figure for 1956. The pulp and paper industry has turned in a performance of output and employment that is only slightly shaded by that of the previous year.

Throughout the West the relative stability of agriculture and the extremely heavy backlog of construction (over 24% of the U. S. total—see below) provide a sound floor under the economy. All in all the West appears to be in a position to weather the current down slide in national business with less dislocation and distress than any other section of the country—and probably will bounce back faster.

Financing Easier

As 1957 closed, the money market improved from the standpoint of the large borrowers. The business down turn, which was noted by some as early as midsummer, began to ease the pressure on the market. With inflation prospects diminishing, the Federal Reserve Bank reduced its discount rate. This latter move was a definite recognition that the administration had reconsidered its tight money policy and probably hints that strong government pressure will be exerted if the deflationary trend of the past couple of months becomes more pronounced.

The prospect of deficit financing, which is definitely inflationary, looms as a possibility in 1958. The treasury department is bumping its head on the debt ceiling. If the political decision is made that we are going to have a butter-and-missiles economy, then additional borrowing against the future appears inevitable. However, Congress has tended to guard the debt ceiling rather zealously so that any increase authorized probably would be a modest one, during 1958. The heavy refunding of government obligations ($48 billion in 1958) probably will not affect the money market as long as new capital is not needed.

Western financial executives, while admitting business might not be quite as good as it was in 1957, rate 1958 as a "very good business year," measured by any previous performance. In their consensus, Western states, being growth states, quite likely will fare better than the nation as a whole, primarily because of the substantial pressures for increased construction. The Western migration still continues and keeps the demand for housing high. State, county and municipal construction programs are extremely large with schools, colleges and similar institutional contracts forming a substantial prop for the Western economy.

Western utilities will not find it either too difficult or too costly to obtain the new money that will be required for the very substantial expansion programs which are under way. In fact, their senior obligations are likely to become more attractive under conditions of a general business down turn. If anyone cares to predict the gyrations of the stock market during 1958 (and no financial executives are this foolhardy), the acceptance and cost of equity money could be predicted also. Investment experts do not foresee any particular change in the past pattern of utility financing immediately.

An improvement in the cost and availability of funds is believed by many to have a beneficial effect on the general housing market. It is quite possible, therefore, that 1957 may have marked the low point in housing starts and that an upturn can be anticipated during the coming year.

Construction Pattern

1958 very likely will see a more highly competitive situation in the construction industry. Practically all items and components are in better supply and deliveries have improved. Under these circumstances buyers are in a position to shop and suppliers are likely to keep pencils sharp.

While construction as a whole may be down from 5 to 7% of the 1957 volume, the pace is still rapid. In the 11 Western states, the backlog of heavy construction, according to the most recent figures of *Engineering News-Record*, totals nearly $27 billion and represents 24.3% of the U. S. total. At this same time last year the total construction backlog was slightly less and represented 23.6% of the U. S. total. The above figures do not include housing projects.

Consultants and contractors expect that construction labor will be more available, although they do not anticipate that productivity will benefit much from this condition. Despite recent statements by union leaders, substantial increase in labor costs does not appear in the offing at this writing. Even though escalation clauses are being written into long-term construction contracts, the prospects for 1958 indicate that construction costs in the aggregate probably will increase only moderately during the coming year.

Labor on the Spot

How does 1958 look on the labor scene? In a nutshell, it looks like a lot of tough poker with no one getting hurt too badly. The labor picture is difficult to assess in generalizations because each agreement is handled locally. Across the negotiating table, it will appear to be business as usual—high demands and moderate settlements, which have been typical for years.

Few people expect the electrical industry in the West to be seriously strike-ridden during 1958. Not so, nationally, with rumors rampant that Carey plans to shut down another electrical equipment manufacturer this year. Many question whether any company rank and file will sit still for a malicious demonstration such as Carey invoked at Westinghouse.

Underlying all negotiations in 1958 will be the uncertainty as to where the economy is headed. This thought will be in the minds of the rank and file, and on both sides of the bargaining table. For this reason, it is expected that settlements will be something off the pattern of the last few years. Strangely enough, the two- and three-year agreements in the industry will tend to support this year's negotiations to the levels set by the long-term contract.

The profit squeeze will drive many businesses to take a firmer stand this year. In some cases, it could be a matter of corporate life and death. The question is will union leadership recognize that only so much blood is in a turnip and be happy with its share?

The trend among NECA chapters and IBEW locals toward freezing into the wage agreement of an extra tax for a joint industry fund to support apprenticeship and promotion of business may be expected to continue.

Success of the Arizona Joint Industry Board in a constructive program and the need in many areas to finance some advertising and business development can be expected to exert pressure from both contractors and union for more such agreements. The idea has salutary aspects if the fund does not get into racketeering hands. Recent scandals in other unions have made IBEW exceedingly cautious to handle such funds without shadow of criticism. Administering such funds by joint boards of trustees makes both union and contractors face up to a business necessity—sales promotion and advertising—that neither have realized existed under the bid and chisel methods of getting employment and work in the past.

Another factor that is bringing realization of some of the facts of business life to unions and contractors associations is the problem of investing fringe benefit trust funds. These must be made in businesses that are healthy enough to pay dividends. A longer range view of the safety of those investments makes labor a partner in business enterprise and as such sober up some of its demands if they may affect the security of its securities designed to provide security for its members.

Without much fanfare, there will probably be a good deal of soul searching, and the emergence of

statesmanship in the union movement. The public is beginning to get a mental picture of union management as a combination boss-mobster-swindler. The house-cleaning won't be evident across the bargaining table—but it will go on.

Over the years, the Pacific Northwest utility pay scale for electrical workers has gotten ahead of the rest of the West. Unions have taken advantage of the public-private squabbles to get the rates up. Look for a stiffening among Northwest companies to get more in line with the rest of the West.

A development in the California Central Valley merits watching. In this area, some of the home builders have bolted from the AGC and have signed with the Mine Workers District 50, a floating local. This puts competing unions in the area. If true to form, look for these groups to carry water on both shoulders until established, then look for rivalry and jurisdictional troubles.

Engineering

How will 1958 fare with the engineering community? On the plus side, tougher business conditions bode well for engineering progress. As one salesman put it: "My line presents a new idea, a chance to save money—and, with today's climate, people listen." In the same vein, with some of the pressure off, engineers have a chance to think, to study, to plan, to analyze.

Manufacturers' plans show an increase in research and development activities, all leading to eventual product improvement. However, in most cases, cost reductions (or a decreased rate of price increases) from this quarter will decrease progressively. More skillful product applications appear to offer the most remunerative rewards.

There is a distinct indication among several utilities that management's attitude toward engineers and engineering is beginning to gel. And 1958 should see increasing attention to engineering assignments —planned rotation, salaries, recruitment and the like. This is not pie-in-the-sky to all engineers, but a recognition of the value of *good engineering* and a willingness to hire, train and pay for it. Engineering is the key to profitable operation—as well as national security. In 1958 these two ideas will be much in the minds of many.

In its February issue, ELECTRICAL WEST presents the annual summary of electric utility budgets and construction programs. From these data, the broad patterns of engineering emphasis for 1958 will emerge. It is expected that the time is near when the subtransmission and distribution of utility systems are due to receive more attention.

Promotion Intensified

Western utilities are going out after new business more vigorously than ever in 1958. Although many budgets were still in the planning stage, 80% of a representative number reporting in early December will increase their spending on promotion.

A selected group of ten of these utilities including private and public power and together serving more than 5,000,000 customers will put a total of $11,087,681 into all types of advertising media in 1958. Of these, seven will up advertising budgets an average of more than 8%. No 1957 figures were available for comparison on the other three but their announced plans indicate a bigger budget.

Appliance manufacturers tend to be optimistic in their forecasts. One representative of a large firm traveling in the West last month believes that business in major appliances will be up in 1958 because inventories are in better balance than they have been for the past two years. Prices are better stabilized than they were a year ago, he said, because there are no large surpluses of unsold items in warehouses. The tags on many items will go up slightly, however.

Teamwork Is the Answer

Despite these optimistic national predictions, representative leaders in the West think that, if the picture is to be improved on appliance sales and rate of domestic kwh growth, utilities, manufacturers and distributors are going to have to pull together even better than they have in the past. This is the opinion of the majority replying to an ELECTRICAL WEST survey, which will be reported in detail in another issue.

Ample evidence that teamwork pays can be found in areas having strong electrical bureaus. Industry leaders would like to see more of this partnership promotion.

Answering utilities were almost unanimous in accepting responsibility for leadership in the coordination job. But they would like to see better communication clear through to the man on the sales floor; better timing on new product introductions and more information about them; more efficient appliance servicing.

Among the things the manufacturer-distributor would like from the utilities is a clear-cut statement of policy on loads they want on their lines and appliances they believe are worth promoting.

Both groups are conscious that money is being wasted. "Utilities are spending a lot of money," remarked one distributor, "but it is only 50% effective unless there is cooperation between their people and those at the point of sale." And one utility man commented, "a promotional campaign sometimes fails to deliver maximum results because the dealer salesman hasn't even heard of it, despite the fact that his employer has invested a substantial amount of money in it."

Political Clouds

1958 probably will not be an easy year for investor-owned power companies. Congress, smarting under the dismal showing of the missile program, is liable to be more sensitive about U. S. prestige on other scientific fronts. The atomic progress, for example, has been slowed by the economic facts of life. Strong legislative support therefore may be expected for federal support of an accelerated atomic program. Whether it will be a quantitative or a qualitative race remains to be seen but several congressmen have been vocal about a new program of federally financed, large scale atomic power stations.

Public power proponents are seeking to put all kinds of roadblocks in the way of private or partnership developments on the Columbia, Snake and in the Sacramento Basin. Intermountain and Pacific Southwest states are bickering about water use and rights on the Colorado—touched off by the Glen Canyon program. California is divided on how to allocate the state's runoff equitably through its vast water program.

In an election year, porkbarreling and logrolling are traditional and even the extra heavy pressures for federal economy can not be expected to win out over the expediencies of political survival. The logical inference is that spending under the guise of science, prestige, public works and security won't find many dissenters.

All of these things either slow down private development or tend to enlarge the federal power empire. Hence the battle of government vs free enterprise is liable to intensify in the coming months.

TV interviews such as San Diego's Homemaker show help tell the story

Model homes are still one of the best ways to promote electrical living. This one is the 1957 Electri-Living Home at Los Angeles, one of four in the West

Early reports from utility executives indicate that 1958 will see . . .

Western Promotion Budgets at

Utilities in the 11 Western states will step up their load-building activities in 1958 even above the 1957 postwar high, according to reports to ELECTRICAL WEST from commercial executives.

The early December deadline for these reports prevents complete return but the 41 responding utilities serve approximately 84% of the electric customers in the West.

Few executives were ready to put a dollar figure on 1958 promotion but 80% of those who had completed their budgets were increasing total spending. A selected group, representing private and public power and together serving more than 5,000,000 customers, is planning to spend $11,087,681 on all types of advertising during 1958.

One West Coast company reported that it would increase promotional expense 10% over the 1957 figure, which was approximately $1.75 per customer.

Will Support National Programs

Responding utilities will support national load-building efforts of such organizations as EEI and NEMA. To get the full benefit of concerted action, national calendars will be used largely for promotion timing.

Live Better . . . Electrically and the Housepower program will be supported actively by 93% of the reporting group, with particular emphasis on the Medallion Home.

The majority will get behind National Electrical Week promotion with tie-in advertising. Plans for industry-wide observance are reported from Pacific Gas and Electric and Washington Water Power territory. California Electric Power and Seattle City Light are among those that will assist with special newspaper supplements. Salt River Power District will dedicate its new 200,000-kw generating plant during the week and will arrange a series of local club programs.

Eighty-four per cent of the responding utilities will put on exhibits at fairs and expositions. A smaller group—22%—will have traveling shows or exhibits.

Those maintaining permanent exhibits—more than half the reporting group—use them for institutional advertising and to promote adequate wiring and electric kitchens. Many have regular appliance display space at headquarters or in district offices for use of dealers or manufacturers on a rotating basis.

Model electric kitchens for demonstration and display have built public good will and sales in several areas. One of the newest of these kitchens is in the Los Angeles Department of Water & Power's Van Nuys service center. This model features an area for everyone—father, mother and teenagers—and "no clutter anywhere."

Chelan PUD uses lobby space to push the 200-amp service entrance as the "Heart of the Home," and will recommend 200 amp in all new construction.

Helps for Homemakers

Cooking and home making schools will be conducted by 62% of the utilities and 24% will put on contests in connection with this activity. More than 2,600 schools have been scheduled already.

Almost half the group helps customers or dealers with kitchen planning. A few have set up special departments for this but the majority offer the service through their home economic departments. Southern

Success of Sacramento's 1957 cooking schools for the blind has resulted in plans for future sessions to teach use and advantages of other electric equipment

New Postwar High

California Edison, one of the first to make kitchen planning a separate activity, now employs three designers to resolve ideas and suggestions from field consultants who work with builders, architects and contractors. Hawaiian Electric and Washington Water Power also will draw up kitchen plans.

Home lighting, too, is promoted by almost half the group, largely through home economists. Hawaiian Electric gives free home and garden lighting layout service. Seattle City Light will install garden lighting in adequately wired homes.

PG and E employs one man full time on residential lighting promotion and is carrying on an active mass education program through model home demonstrations and advertising (see p 98). Utah Power & Light will continue to use its portable home lighting demonstration cases at fairs and elsewhere.

Commercial Promotions

Practically all the utilities will promote commercial cooking and lighting and a big percentage will push commercial and industrial wiring. Most of them work through personal contacts with customers and contractors, supplemented by direct mail and ads in the trade press. A good many sponsor commercial electric cooking schools in cooperation with manufacturers.

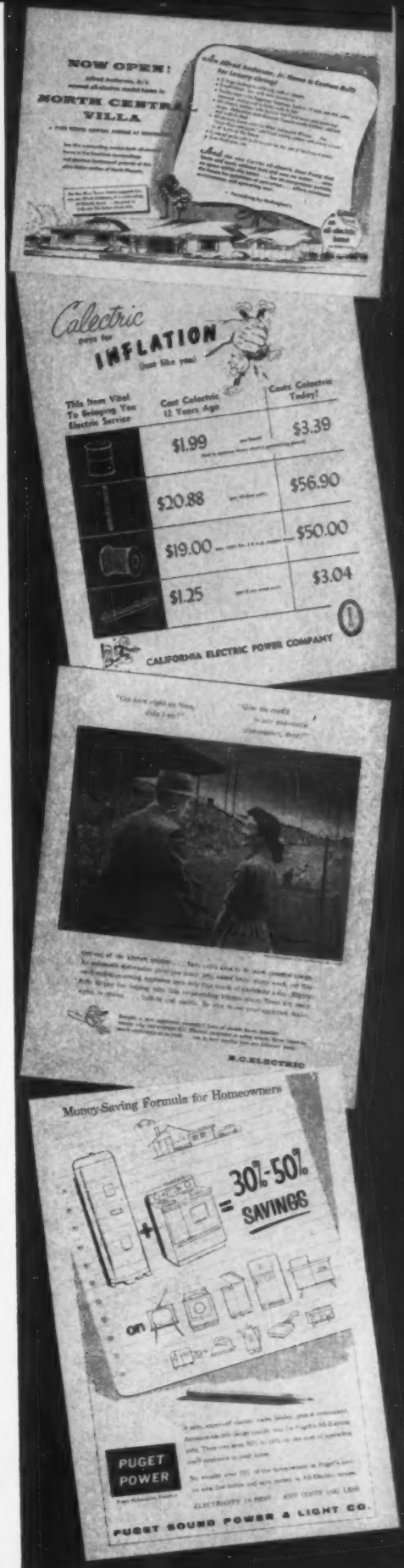
PG and E will send a traveling store lighting clinic to about 20 larger and medium size communities in its service area, where sessions will be conducted in cooperation with local electrical contractors.

Edison will organize a series of coffee-break conferences in manufacturers' plants to discuss the advantages of electric installations. Los Angeles Department of Water & Power offers partial subsidy of wiring for commercial cooking equipment and makes commercial and industrial lighting layouts. It also promotes industrial heat and air conditioning for stores, offices and industries.

Puget Sound Power & Light will cooperate with manufacturers and distributors in direct sale of commercial equipment.

These Will Be Pushed

Where specific appliance promotions were mentioned, laundry



Outdoor advertising is an effective way to boost sales of electric appliances

equipment, primarily dryers, took the lead, followed by ranges, freezers, water heaters, bed covering, air conditioning. Electric heat will be promoted actively in some areas, particularly in sections of the Northwest.

Special promotions already have been scheduled by many of the utilities. Clark County PUD hopes to set up a Parade of Medallion Homes featuring major appliances and electric heat. Snohomish County PUD will celebrate completion of its three-year residential street lighting modernization program.

Montana Power will continue its time-pay wiring promotion and its tie-in with national promotions, adding the Medallion Home. Portland General Electric will sponsor an "Electricity at Work" contest for high school students who develop projects utilizing electricity. Prize will be a $500 college scholarship, plus a TV set for the school.

Cowlitz County PUD will kick off its Better Electric Living promotion during National Electrical Week and has persuaded the Lions Club to schedule its annual Home Show for Feb. 14-16.

What Media Will Be Used?

Every advertising media will be used to boost electrical living.

Newspapers, of course, get a large share of the budget for institutional and cooperative appliance advertising. Utah Power & Light is among those that said color would be used in certain newspaper ads.

Montana Power is studying the possibility of inaugurating Electrical Tuesday, the first Tuesday of every month, in Butte, Billings, Great Falls and Missoula. The entire industry would support this newspaper promotion.

Television and radio also are being used to good advantage. Spots and news broadcasts are the favorites but several utilities have scheduled special programs.

Weather broadcasts have good audience appeal and are sponsored by a growing number of utilities. San Diego Gas & Electric, one of the first with its Weatherword program, will continue this popular program on TV as well as the Homemaker of the Week TV film visit to outstanding homes in its service area. It will also have a daily Home

Free repairs to major electrical appliances damaged by tidal wave
Another MODEL HOME with a smart and modern ALL-ELECTRIC KITCHEN
See the GUILD MODEL HOME IN GOLF COURSE TERRACE
Look for the FLAMELESS ELECTRIC KITCHEN
Drive Out Today
BUDDY'S FREE COOKING CLASS
ARE YOU CONSTANTLY BLOWING FUSES?
Rewire now the easy PGE way
PORTLAND GENERAL ELECTRIC COMPANY
P. G. and E. electric customers...win
free
Refrigerator-Freezers or Freezers
116 PRIZES
Freezers, Refrigerator-Freezers, Frozen Food
Enter the Northern California Electrical Bureau's Jolly Jingle Contest. Just complete the jingle below:
OFFICIAL ENTRY BLANK
ENTER NOW ... you may be one of the 116 winners! P-G-E

Copy like this is used on posters, counter cards, truck placards, bill stuffers

on Ranch radio pragram featuring news and events of interest to farmers.

PG and E will replace its O. Henry Playhouse on TV with a new program entitled The Big Story. Public Service of Colorado will sponsor its Panorama once a week at 9:30 p.m. Public Service of New Mexico will have Meet the Press on TV and three radio musical programs in addition to news and weather reports.

B. C. Electric's Cecil Solly radio program will be on the air for 15 minutes five nights a week and its Valley Visit, a five-minute program, will be on five times a week.

Other Media

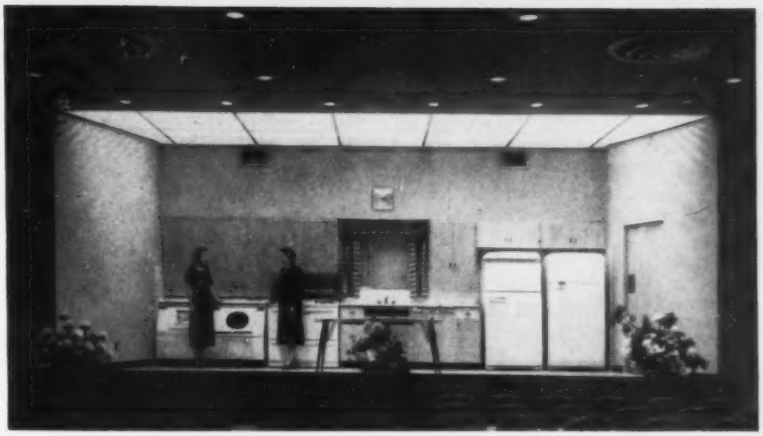
Outdoor advertising will be employed by 35% of the responding utilities, with several making good use of sign boards at model home sites.

Other media to tell the electric story are office displays, bill stuffers, truck placards, pamphlets, direct mail, school publications, builders' booklets, trade magazines, transit cards, mailings of tested recipes, counter cards, films, postage meter advertising.

Dealer Aids

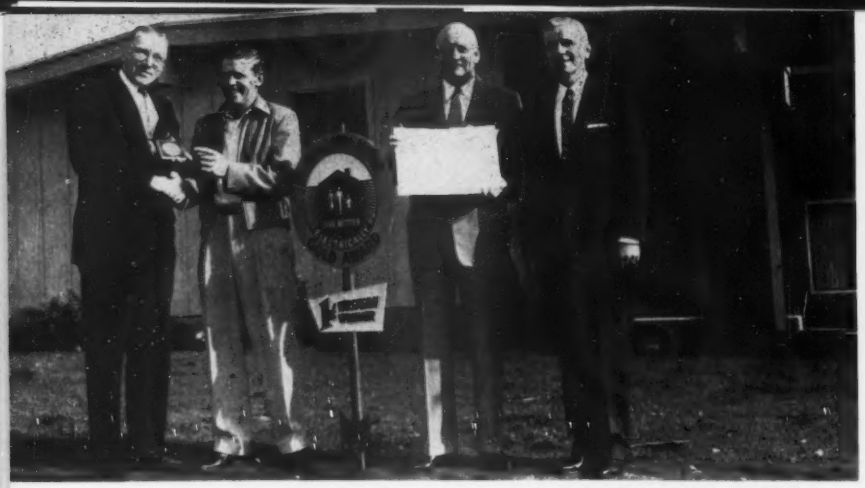
More than half the utilities will help train dealer salesmen. Seventy-eight per cent will cooperate in store demonstrations and 65% will provide demonstrators. Slightly less than half will furnish consumer mailing lists to dealers.

And so in one way and another everybody in the 11 Western states should see and hear the electric story, well told, in the coming 12 months.



Demonstration kitchens, such as this one in Puget Power's new Bellevue headquarters, help utilities perform a very popular customer service and build load

Built-in kitchens in model homes furnish ideas for new construction or remodeling. This one is from the 1957 Parade of Homes in Honolulu



The nation's first electric utility to receive a LBE Medallion—a gold one at that—was Ralph P. Sherman, builder of the Boise Electri-Living Home. Here A. S. Gilbert, Idaho Power Co.'s general sales manager, presents the award to Sherman, while John Kimball, Idaho Power vice-president and general manager, and Frank Falge, Western regional manager, Live Better . . . Electrically, look on

Medallion Home Added to program as Live Better Electrically

Moves Ahead

Frank Falge
Western Regional Manager
Live Better . . . Electrically

The year 1957 might well be called the "Year of Cooperation" for it saw unity in the electrical business unparalleled at any time in the past. Live Better . . . Electrically and Housepower provided the linkage that brought all utilities closer together in their thinking and planning and brought manufacturers, distributors and dealers together in a common bond with the utilities to Sell Better Electrically.

It is significant that in a year of economic uncertainty, tight money and reduced home building residential kwh sales continued to rise and that appliance sales fared better than might have been expected under the adverse conditions.

More than 300 utilities, over 80 of them here in the West, intensified their activities and promoted, in many cases, the same things, at the same time, coordinating with the EEI Residential Promotional Calendar and the strong backdrop of national advertising provided by Live Better . . . Electrically and Housepower. Adjoining utilities frequently joined together to present a united promotional front.

More than 180 electrical manufacturers actively joined with the Live Better . . . Electrically program. The stage is now set for implementing this participation through distributors and dealers, so as to have even more consumer effect in 1958.

Nationally load growth accelerated very satisfactorily from Jan. 1, 1956, starting with a 12-month increase of 202 kwh and hitting a peak of 237 kwh. Then the curve turned downward, reaching a low of 182 kwh in June. It is encouraging to see that this downward curve has been reversed and load growth is again accelerating.

During 1957 appliance sales were also depressed, showing how appliance and kwh sales go hand in hand. In 1957 it is estimated that utility expenditures for sales promotion and advertising were fairly close to 1956, 1.62% of gross. Prewar, utilities spent considerably more on promotion and advertising, about 2.5% of gross, another factor of great importance to both load and appliance sales growth.

Unfortunately comparative data have not been compiled for the West, but the excellent results of load-building activities reported by many individual utilities would indicate that this area fared much better than the national average.

In northern California, for example, all major appliances except electric dryers and washers, showed sales gains for 1957. Pacific Gas and Electric Co. reports nine months' appliance sales as follows:

Freezers	11.6% increase
Ranges	9.5% increase
Water heaters	8.2% increase
Dishwashers	12.0% increase
Refrigerators	No. change
Dryers	9.5% decrease
Washers	14.5% decrease

Intensified promotion by PG and E with a TV program, plus a stepped up promotion by the Northern California Electrical Bureau helped obtain these results. The dryer campaign, which was successfully held in the spring of 1956, was not repeated this spring, but was held in the fall, which accounts for the decline in dryer sales and to some extent automatic washers.

Sales reports from other utilities

(Continued on page 100)

Key Home-Building Areas, 1956, and Estimated Medallion Homes, 1958

City	Rank	Units	%	Medallion Objectives Bronze	Gold
Los Angeles, Calif.	(1)	89,300	7.9 %	8,000	1,600
San Francisco-Oakland Calif.	(6)	22,000	1.96%	2,000	400
San Bernardino-Riverside-Ontario, Calif.	(7)	17,200	1,53%	1,600	320
San Diego, Calif.	(11)	13,300	1.18%	1,200	240
Denver, Colo.	(21)	9,200	.82%	830	165
San Jose, Calif.	(22)	9,200	.82%	830	165
Phoenix, Ariz.	(24)	8,500	.76%	765	155
Seattle, Wash.	(27)	7,100	.63%	640	130
Sacramento, Calif.	(31)	5,900	.52%	530	105
Portland, Ore.	(37)	4,200	.37%	380	75
Salt Lake City, Utah	(46)	3,600	.32%	325	65
Total		189,500		17,100	3,420

Follow the line to see how Calectric engineers use a small computer to . . .

Cut Drudgery — Stretch Engineers

A. J. Mischnick

Supervisory Engineer, Distribution Studies
California Electric Power Co.

The increasing demand for engineers in the utility field has prompted a search for ways to increase the engineers' time for pure engineering. One of the tools found in nearly all utility accounting sections is a digital computer or data processing machine. These machines are very useful for repetitive-type engineering problems, if a little planning is used in preparing the problem.

A considerable number of good articles have been written to cover the use of medium- or large-size digital computers for utility engineering problems. Generally, the use of machines of the IBM 604 class for engineering problems has been dismissed without full consideration of the potentialities.

One problem that has long been a time-consuming and tedious part of distribution system planning is the primary circuit voltage drop and loss problem. This particular problem lends itself very readily to the use of the 604. Since the logging of the necessary information to compute the voltage drops and losses for the primaries is the most time-consuming part of the system planning study, a method for gathering this information has been devised that can be used by anyone. It is not necessary for the engineer making the study to gather and judiciously arrange the information for circuit calculations. By logging the information on a reproducible form and processing the information by means of the 604, *the engineer needs merely to evaluate the results.* This means a real saving in the engineers' time. It should be pointed out that generally a study that requires a considerable amount of system planning requires a relatively large number of circuit voltage drop and loss calculations. If a single circuit is being studied, it may be much simpler to make the few calculations by means of a slide rule or desk calculator. Generally, however, the studies that require the attention of the engineering department are studies involving major circuit changes, such as substation additions or cutovers to higher primary voltages.

Programming

Programming any problem for machine calculation almost invariably leads to simplifications in the formulas used. The programmer must always be watchful for ways of simplifying the method of solution and thereby cutting down on program steps. Many times, when a problem is programmed for machine computation, a simplification is discovered that enhances the slide-rule or desk-calculator method of solving

Calectric's Equations

The solution of a primary distribution system planning study involves many possible alternatives. The method described here lends itself quite readily to machine computation and has proved to be sufficiently accurate for distribution system planning. This method employs:

1. The connected kva along the circuit;
2. The distance in feet between loads;
3. The conductor size and spacing;
4. The circuit demand factor; and
5. The operating power factor.

In setting up this program, a table of voltage-drop factors and loss factors was compiled for various standard conductor sizes with the associated spacings and for various operating voltages and power factors. The voltage drop factors were calculated on a 10^4 kva-ft base and the loss factors were calculated on a 10^6 kva^2-ft base. These bases were selected simply for the convenience of machine handling. The voltage drops are calculated by the equation:

$$\% \text{ VD} = \text{BEF}/10^4$$

and the losses are calculated by the equation:

$$\text{Loss kw} = \text{BE}^2\text{G}/10^6$$

where:

B = circuit section distance in feet
E = circuit section total kva load
F = voltage drop factor
G = loss factor

similar problems. No lumping of loads is necessary for this method of computation. Branch circuit loads, however, must be summed at the point of take-off from the main circuit. Separate calculations for these branches may be run individually when this is necessary.

Tabulation and Computation

After the information is all gathered and tabulated on the appropriate forms, the complete listing is turned over to the supervisor of the machine accounting section. The machine accounting supervisor schedules the key punching and machine time, tabulates the results and returns the complete tabulation to the engineer conducting the study. One card is punched for each circuit section. These cards are run through the 604 at the rate of 100 per minute. The results are punched in the same cards and tabulated at the rate of 100 per minute.

Evaluation

When the engineer gets the results of the computations from the machine accounting section, he lists the results on another prepared form. The latter form provides a convenient and orderly method for calculating the corrected kw and kwh losses. This form also serves as a record for this particular circuit study.

It is interesting to note the close correlation between the calculated voltage drops and actual field measurements. In the very low percentage of cases where the field measurements did not check the calculated results, further tests invariably uncovered some irregularity that was not known when the calculations were set up.

Many Problems Solved

Calculating the voltage drop and loss factors for use with this voltage drop and loss program, distribution transformer loss data for curve plotting and economic benefits from the installation of shunt capacitors are a few examples of problems that have been solved by use of the 604. Many other problems as portions of engineering studies have been solved by use of the 604.

The use of electronic computers should be investigated for many of the seemingly routine calculations that appear to be easier on the desk calculator. Many of these time-consuming calculations can be turned into an evaluation of the calculated results by the engineer. This turns into real savings in time and, when the program is properly set up, the possibility of errors in calculations is very remote.

1—The author, left, and G. W. Prior combine skills to simplify the problem so that it can be done with a simple program. End result is the formulas in box, upper left

2—Engineering department clerical assistant takes transformer kvas' wire sizes, spans and the like from existing maps and prints and . . .

3—with a little training fills out the data sheet from column G. Additional columns are for simple calculations, which can be done on a desk calculator. Then . . .

4—a punch card operator puts the tabulated information on cards and they are turned over to the . . .

5—machine accounting section where the cards and program are processed

6—The machine prints columns A through G and calculates and prints H through K. See data sheet 3, above

7—From this sheet, entries are made on the evaluation sheet and simple extensions are performed—all by clerical assistants. Then . . .

8—with all of the routine work completed, the engineers can quickly size up the situation and specify a solution. Slick!

OVERHEAD DISTRIBUTION SECTION PRIMARY CIRCUIT DATA FOR IBM 604 ELECTRONIC CALCULATING PUNCH

District Hemet Substation Magnesite Circuit West Circuit Voltage 4160

A	B	C	D	E	F	G	H	I	J	K
			Transformer Kw.				At 100% Demand Factor			
Station	Distance	Conductor Size	At Station	Sum Subtotal	Unit Volt. Drop Factor %	Unit Loss Factor	Basic E Voltage Drop Basic Ft.-Line Loss Kw			
							Dx.//10⁴	Subtotal	Kw²x0/10⁵	Subtot.
77701	2706	4W40	70.0	969.5	01710	01510				
77705	1320		225	899.5						
77707	661		10.0	877.0						
77709	662		290.0	867.0						
77724	1331		12.5	577.0						
77727	658		31.0	564.5						
77728	220		20.0	533.5						
77731	659		5.0	513.5						
77738	983		7.5	508.5						
77740	503		15	501.0						
77744	1031		6.5	499.5						
77748	1066		3.0	493.0						
77752	1056	↓	273.0	490.0	↓	↓				
77763	2875	6660	—	217.0	02480	02410				
77772	2112	4W40	58.0	217.0	01710	01510				
217736	2760		15.0	159.0						
217767	2558		3.0	144.0						
217777	5285	↓	43.0	141.0	↓	↓				
217873	592	6660	5.0	98.0	02480	02410				
217923	681		30.0	93.0						
217972	1338		3.0	63.0						
217401	1882		5.0	60.0						
219930	3426		30.0	55.0						
219945	2815	↓	25.0	25.0	↓	↓				

H		I		J		K	
4	485	4	485	38	40	38	40
2	030	6	515	16	12	54	52
	992	7	507	7	68	62	20
	982	8	489	7	52	69	72
1	313	9	802	6	69	76	41
	634	10	436	3	16	79	57
	200	10	636		94	80	51
	578	11	214	2	62	83	13
	855	12	069	3	84	86	97
	431	12	500	1	91	88	88
	881	13	381	3	88	92	76
	891	14	272	3	88	96	64
	884	15	156	3	82	100	46
1	067	16	223	2	04	102	50
1	136	17	359	2	40	104	90
	751	18	110	1	05	105	95
	629	18	739		80	106	75
1	274	20	013	1	59	108	34
	144	20	157		14	108	48
	156	20	313		14	108	62
	208	20	521		13	108	75
	280	20	801		16	108	91
	466	21	267		25	109	16
	174	21	441		4	109	20
21	441			109	20		

OVERHEAD DISTRIBUTION SECTION

Voltage Drop and Line Loss Calculations Form

District Hemet

Substation Magnesite

Circuit West

Circuit Voltage 4160

1. Total Detailed Transformer Kva..... 969.5
2. Maximum Circuit Load, Kva..... 441.
3. Demand Factor, 2/1..... 0.455
4. Circuit Load Factor, in Per Cent..... 0.34
5. Basic Drop, Sub. to Last Transformer, in Per Cent..... 21.4
6. Basic Drop, Sub. to First Transformer, in Per Cent..... ----
7. Basic Drop, First to Last Transformer, in Per Cent..... ----
8. Calculated Peak Drop, Sub. to Last Transformer, in Per Cent, 5 x 3... 9.7 X
9. Calculated Peak Drop, Sub. to First Transformer, in Per Cent, 6 x 3... ----
10. Calculated Peak Drop, First to Last Transformer, Per Cent, 7 x 3..... ----
11. Basic Peak Line Loss, Circuit Total, in Kw..... 109.20
12. Calculated Peak Line Loss in Kw, 11 x 3²..... 22.61 X
13. Loss Factor (From A.I.E.E. Ld. F. vs Ld. F. Curve)..... 0.185
14. Calculated Average Line Loss in Kw, 12 x 13..... 4.18
15. Calculated Line Loss in Kwhrs. per Year..... 36,640
16. Annual Dollar Value of Loss at 5.5 mills/Kwhr..... 201.51 X

X All — even W/ regulators this line has. Too much regulation and losses. Im getting out instructions to cut over to 12 Kv. OK?

Jim

Workman fits a metal gasket over the spigot end to make a seal against the inside of the bell end of the next pipe

A clamp and torque wrench pull the spigot into the bell completing this seal. Welders tack end of bell to pipe

Gas-filled potheads. New construction ideas used as PG and E installs 110-kv underground transmission to get . . .

More Power Downtown

Kenneth L. C. Dorking
General Operating Foreman

J. C. Coulter
Electrical Engineer

Pacific Gas and Electric Co.

The Pacific Gas and Electric Co. has just completed a four mile, 110 kv, high pressure, gas filled, pipe type, cable installation to bring more power into downtown San Francisco.

With an excellent service record for 10 years on 18 circuit miles in San Francisco and for five years on eight circuit miles in Richmond, gas-filled, pipe-type cable was again specified. The cable is 1,000 mcm, compact segmental, single conductor, copper, rated 120 kv, with 500 mils of oil impregnated paper insulation. The cable was manufactured in the Bay area.

Pipe Installation

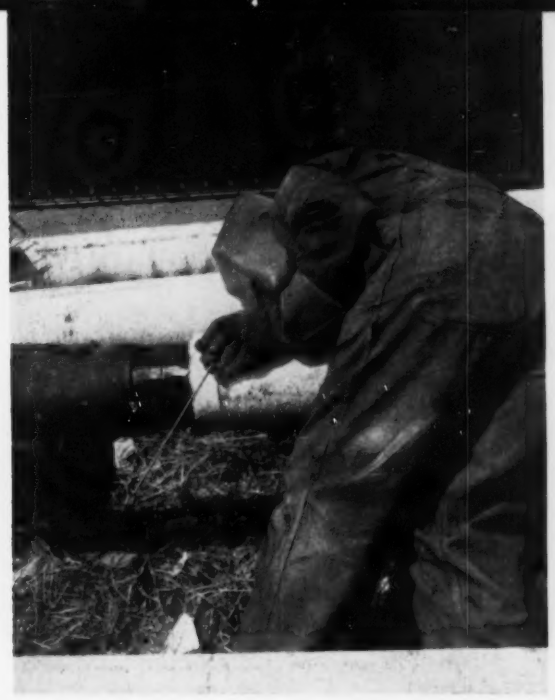
The 40-ft lengths of 6⅝-in. OD steel pipe which served as the conduit for the 110-kv cable were coated externally with Somastic and internally with No-Oxide No. 260 for protection against corrosion. The pipe was inspected upon receipt at the storage yard and the ends sealed with plastic end caps to prevent moisture and contamination from entering the pipe.

The four miles of trenching and pipe installation was done by the PG and E's own gas construction crews.

The bell-and-spigot method of joining the pipe sections was utilized and generally sections of three lengths were welded together before being placed in the trench. A new method of pressure testing the welds was devised for this job. Previously, the entire internal volume of the pipe was pressured to 100 psi with dry air and the weld checked with a water bath to detect any leaks. To speed up this lengthy process, a copper gasket was designed to fit over the spigot end of the pipe. Half-inch wide, .012-in.-thick copper strips were formed into hoops matching the outside diameter of the pipe with one edge rolled to catch on the edge of the spigot. The gasket was seated against the bell end by clamping the joint with a compressive force of 10,000 lb. After tack-welding the joint, the clamp was removed and a three-pass weld completed. The weld was then tested by introducing dry nitrogen at 200 psi into the small area between the bell and spigot pipe ends through a ⅛-in. hole in the bell. The ⅛-in. hole was welded over upon successful completion of the weld test. This method of weld testing was fast and efficient and permitted more flexibility in pipe laying and backfilling of the open trench.

Backfill May Up Capability

In light of the advances made in the art, it was decided to review the subject of backfill. Since the natur-



Clamp removed, welder makes a three pass weld. Notice threaded hole which gives access between weld and gasket

Fixture surrounds weld with water. Nitrogen pressure is applied to test weld. Test hole is finally welded shut

ally occurring sand found in much of San Francisco had been found to have a high thermal resistance, the backfill on previous installations was screened spoil bank material or selected rock-free loam. Tests were made of loams now available in the area and they were found to have a rather high thermal resistance and a sufficient quantity of suitable loam was difficult to locate.

Backfills Tested

The use of special sands by some eastern utilities led to an investigation of sands available locally. The accompanying curve shows the results of tests made on possible backfill materials. Sands A, B, C and D are washed concrete sands while sand D is a fine grain local beach sand. Sands A and B were chosen because of their good thermal conductivity even at low moisture content.

Spot checks of existing soil moisture content along the line made during construction ranged from 2.5% to 30.6%. A minimum of 3 in. of sand under the pipe and 6-in. cover with a trench width of 2 ft was specified and the spoil bank used for the balance. A total of 27 thermocouples was installed on the pipe at crossings of other heat radiating utilities or in areas of very low soil moisture content to gain information and to aid in determining the load capability of the cable. In addition, in the latter area, soil moisture coupons (commercially available devices similar in operation to a resistance temperature detector and developed for agricultural uses) were installed to correlate soil moisture with pipe temperature.

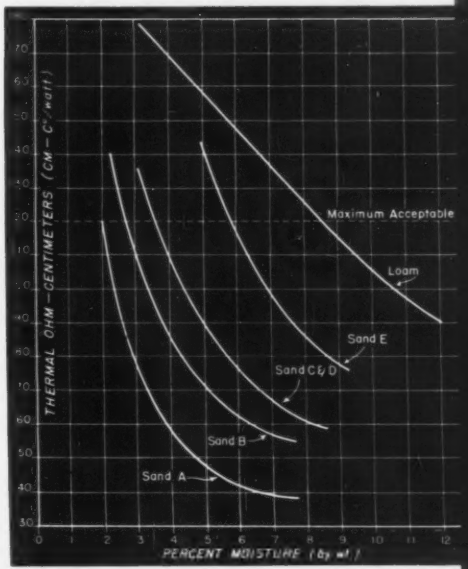
Cable Pulling

Through careful analysis based on the equations derived by Rifenburg and the experience from previous installations, the distance between manholes was increased and the number of manholes reduced from 18 on the existing line to 11 on the new line. The design criteria were minimum radius of 200 ft on vertical bends and 75 ft on horizontal bends; the maximum pull was 2,485 ft and the average distance was 1,900 ft.

A removable rack anchored to a low-bed semitrailer was used to support the three reels of cable during transportation to job site and pulling operation. A 7/8-in. steel wire rope on a specially designed winch drum was used to pull the cable. The cables were attached to the pulling line by a steel yoke that was designed to accommodate the pulling bolts attached to the cable ends. The maximum tension recorded during the cable pulls was 15,000 lb.

Trouble!

The cable pulling became a routine operation until damage to one conductor on the cable reel was discovered just after the start of the seventh cable pull. The outer surface of the cable had been gouged cutting the copper shielding tape and a few layers of the insulation. The cause of the damage could not be determined but an immediate decision on the situation had to be made. Although the damage was located approximately 400 ft from the cable end, only 15 ft of cable had been pulled into the conduit before the damage was noticed. The cable could be cut salvaging the remainder of the three conductors for a shorter pull or an on-the-spot field repair could be attempted. Since the gouge



Splicing under way with compression sleeve connector showing, foreground. Workmen carefully apply 107 layers of tape

Pulling operations about to begin. Notice how cable pulling bolts fit into slots by means of only two nuts

in the cable did not appear to cut deeply into the cable insulation, it was decided to pull ahead until the damaged cable was suspended between the cable reel and the feed-in guide reel.

An expert journeyman was rushed to the job site and repaired the cable under the careful guidance of the PG and E and the manufacturer's engineers. It was necessary to unwrap about 24 in. of the skid wire, the copper shielding, mylar, metallized paper tapes and three layers of 6½-mil paper insulation that had been punctured. The paper tapes were replaced, staggering and butting the cut ends. The metallized paper tape and the intercalated mylar and copper shielding tapes were placed back in position and the copper tapes soldered together. To prevent damage to the cable insulation when the bronze skid wires were silver soldered back together, a piece of sheet asbestos was placed under the skid wire and removed after the soldering operation. Upon completion of the repair, the cable pull was resumed after a four-hour delay.

Subsequent to the field repair on the cable, the repair procedure was recreated with particular emphasis to any damage to the insulation that could have occurred during the silver soldering of the skid wire. The sheet asbestos provided adequate protection to the cable insulation even when the heat required in silver soldering the skid wire was maintained for extended periods.

A tense moment as the authors confer with cable manufacturer's engineers about a damaged section. A factory representative rushed to the scene for repairs

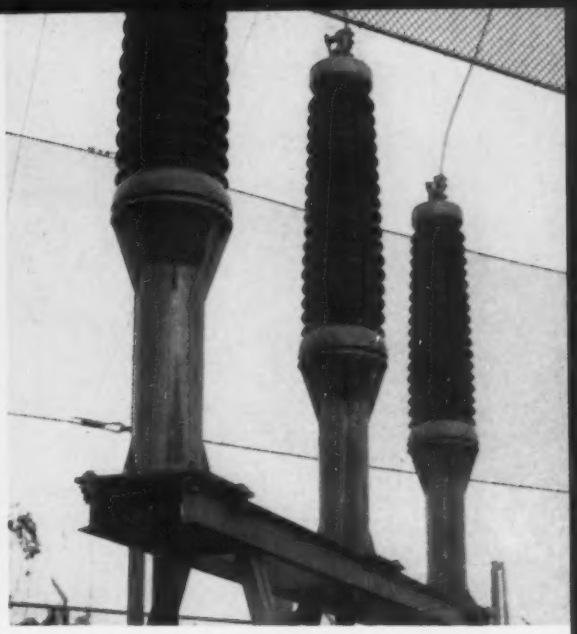
New Terminal Pull

In order to pull the cable from the terminal bases to the first manhole in the field, it was necessary to suspend, from a crane, an empty 84-in. cable reel, 25 ft in the air parallel to the copper riser pipes connecting the terminal bases to the steel conduit. The cable was taken up over the empty reel and guided down through the copper riser pipes. An opening was left where the copper riser pipes were to join the 6-in. conduit. At this location, the pulling yoke was assembled, shackled to the pulling cable and the cable pull completed. A steel casing was then placed over the gap left to assemble the pulling yoke and welded in place.

Humidity Control

A new splicing trailer to provide a portable workshop was equipped for the job. The trailer was also outfitted with dehumidifying equipment, consisting of a 2.4-ton refrigeration unit, a two-speed blower and a 10,000-w space heater, to maintain a relative humidity of 30-40% at 70 F in the manhole during splicing. Air from the trailer was pulled across the cooling fins of the refrigeration unit condensing the moisture, blown through the space heater to warm the air and to reduce the relative humidity, and then discharged into the manhole via a 10-in. flexible air

The pothead interior has the bottom stress cone finished and wrapped with conducting braid. Above, buildup of paper



Potheads are subjected to full pressure of nitrogen line. Advantage is freedom from gas-oil seal and oil auxiliaries

duct. The 1,000-cfm dehumidifying unit was also used to dry the manhole prior to starting the splicing operation.

Dry Manholes

The addition of 5/6 oz of Darox per sack of cement in the six-sack-per-yard concrete mix reduced the porosity of the concrete. The increased density and monolithic pour resulted in a very tight, dry manhole for cable splicing.

Splicing

The splicing of high-voltage cable requires very precise work on the part of the splicing crews. Once started, the splice must be continued until completed. After pressing the connector joining the conductor, the 107 layers of cable insulation have to be stepped one layer at a time to form a uniform taper to be matched by the hand applied matching insulating tapes. A stress cone consisting of 107 layers of paper insulation is built up over the normal cable insulation. Copper braid is one-half lapped across the completed stress cone and connected to the copper shielding tape at each end of the splice. Initially the splicing of the three conductors required 125 hours of continuous shift work from the removal of the cable protectors to the welding of the splice casing. As the splicing crews perfected their technique, the splicing time was reduced to 72 hours per splice.

First All-Gas Potheads

This installation, it is believed, marks the first use of a commercially available 138-kv high-pressure all-gas pothead, in which the porcelain is subjected to full-line pressure. Above the cable insulation, bulk insulation is added in the form of preimpregnated and drained 5-mil paper rolls of the same material as the factory applied tapes. Six rolls are used, the largest being 60 in. long, 2⅛ in. ID and 4⅛ in. OD. This roll is placed over the cable insulation and tightened by twisting the roll and pulling axially to form the lower contour of the stress cone. The other rolls are successively slipped over the preceding roll and tightened and pulled to complete the lower stress cone. The upper stress cone is formed by tearing the paper rolls in steps. The lower stress cone is covered with conducting braid and grounded. The complete assembly is then covered with two layers of V.C. tape, the porcelain is lowered and bolted in place. This pothead is rated 138 kv and successfully withstood 650-kv impulse tests, 335-kv dry and 275-kv wet, 60-cycle voltage tests. The absence of low-pressure oil in the porcelain chamber and the attendant gas-oil seal, coupled with the ease of assembly in the field, is felt to be a significant step forward in the termination of high-voltage cable.

Start-Up Procedures

Throughout the installation, great care is taken to prevent moisture from getting in the pipe or on the cable. However, the cable is exposed during the pulling and splicing operations. In order to remove all vestiges of moisture the line is evacuated. Piecemeal evacuation was used prior to splicing in which each line section was pumped down to a pressure of 500 microns absolute. A thermocouple vacuum gage was used, which measures the total pressure including condensable vapors and proved very convenient to use under field conditions. After completion of the splicing operation and pothead erection, the complete line was evacuated. The pump was attached to the line at the manhole nearest the center and the line pumped down for 36 hours to a value of 500 microns at the terminals and 90 microns at the middle. Slightly more than one volume of nitrogen was then flushed through with the pump running and the line again evacuated. The pump was then stopped and the line pressure raised to 15 psig with nitrogen and held for eight hours. The line was then given a final evacuation for 36 hours, reaching values of 255 microns at the ends and 70 microns at the center. The vacuum was broken with nitrogen and the line brought up to the 225-psig operating pressure.

Cable Tests

Prior to putting the cable in service, a heat run was conducted by short circuiting one end and passing three-phase current through the conductors for 14 hours, the pipe temperature reaching 114 F in eight hours and held there for the remaining time. The cable was allowed to cool for 10 hours and the process repeated. After this the cable was open circuited at one terminal and built up to 120 kv and then released for system operation.

Steel and concrete take shape, partnership comes to life as . . .

Rocky Reach Grows

"No room here for sissies," barked Bill Griffin, field engineer for Stone & Webster on the Rocky Reach Dam construction.

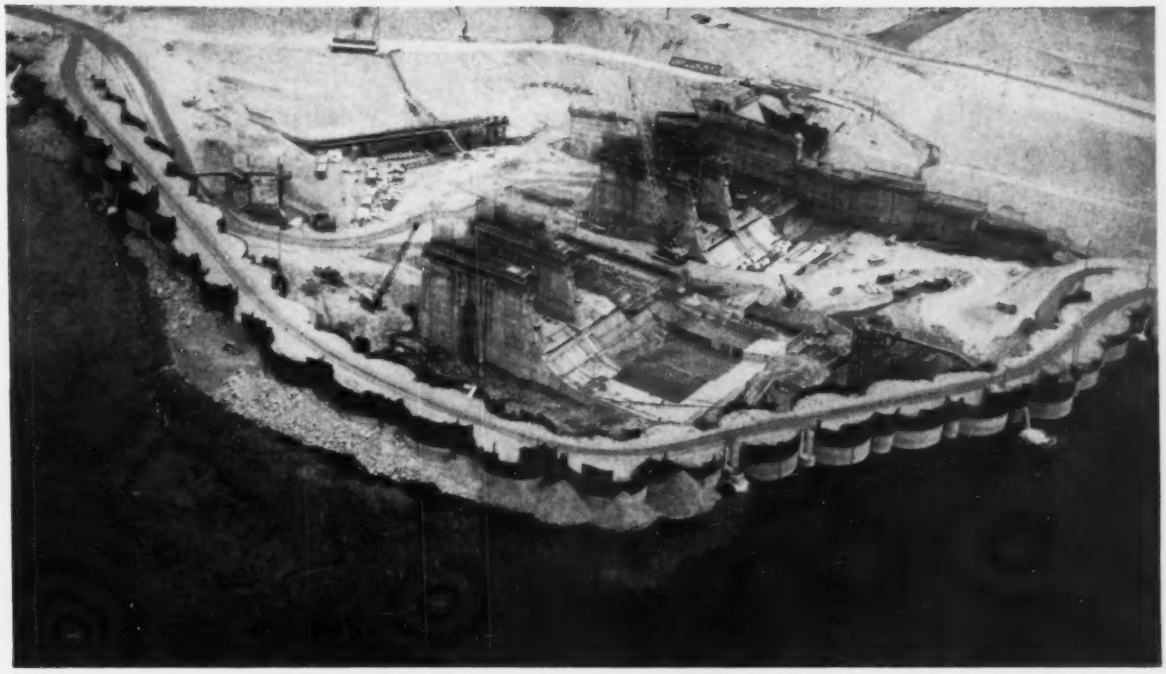
"When you are working 47 ft below the surface of a river, especially one like the Columbia, every man has to put out. Even then, we are barely ahead of the water," Griffin continued. He eyed the pumps removing seepage of 123,000 gpm.

This conversation was carried out amid the clattering noise of pouring concrete for the spillways and buckets on the dam. From our vantage point, a steady stream of lowboy semirigs growled down the short access road. Each was loaded with two or three four-yard concrete buckets. And as each rig swung into place, the operator of the 100-ft boom crane mounted on a Manitowoc very cleverly picked them off.

The concrete bucket is swung in a high loop over the tied reinforcing steel cage. Then it is dumped at a certain location on the spillway block under the direction of a spotter. Men immediately swarm over the stiff pour like ants, using heavy air-powered vibrators to pack the mix into place. These vibrator operators wade halfway to their knees in concrete, heaving a 50-lb machine into different spots of the fresh pour. By any measure, Rocky Reach is one of the Northwest's big projects.

Rocky Reach Dam will be one of the world's major power producers when completed. The $250,000,000 project is situated seven miles upstream from the city of Wenatchee. It will produce some 775,000 kw initially.

The entire dam will be 5,000 ft in length, consisting of an L-shaped gravity concrete structure 3,000 ft long and a 2,000-ft water-impervious cutoff extending into the eastern bank. The principal concrete structure will consist of a 500-ft forebay wall extending from the west bank, a power-house structure 1,090 ft long, a center nonoverflow section 430 ft in length, a spillway section 750 ft long and a 180-ft abutment extending into the east bank of the river. The height from the power house deck to average tailwater will be 104 ft. The average height of the spillway section will be 127 ft above bedrock, while the spillway will be 750 ft long with 12 58x50-ft tainter-type crest gates. These gates will be the largest of their type in the world.



Aerial view shows construction of the spillways and the east abutment. River is 47 ft above working area shown below

Total discharge capacity, including flow through the turbines, will be 1,200,000 cfs. This is 70% more than the great flood of 1894 — the maximum Columbia River flood of record. The Rocky Reach pool area will create a reservoir 43 miles long containing an area of 9,080 acres. Generators are of the vertical-shaft type turning at 90 rpm, rated 107,000 kva at 95% power factor. The turbines will be Kaplan adjustable blade-propeller type rated at approximately 140,000 hp each. Revision for passage of migratory fish will be included in the dam.

The 1,090-ft power house will contain seven generators, with four more to be added when additional upstream storage becomes available. When all 11 generators are installed, the peak production will be more than 1,200,000 kw.

Stage 1 construction is on schedule with Rocky Reach Dam Builders Inc. placing concrete in the spillway section. More than half of the concrete, over 100,000 cu yd, has been poured.

A recent contract included building the power house, installing seven main generators, construction of the nonflow spillway, three of the 12 overflow sections and fishways installation. Approximately 450 men are now employed, with a high of 1,300 employees expected for the working season of 1960.

Prospecting for bedrock is tough. Excavation is for spillway blocks 4 and 5

Contracts for the sale of the 775,000 kw of power to be produced by Rocky Reach Dam now under construction on the Columbia River have been signed and placed in escrow pending finalization of project financing, the Chelan County PUD announced Nov. 29.

"The last major obstacle to financing completion of the project thus has been removed," said L. J. Richardson, PUD president.

Puget Sound Power & Light Co. will take 50% of the power and Alcoa 23%, as previously had been planned. The Portland General Electric Co. will get 16%, Pacific Power & Light Co. 7.1% and Washington Water Power Co. 3.9%.

The PUD is entitled to withdraw up to 138,700 kw from the utilities for use in Chelan and Douglas Counties.

Problems of Management — I

What Makes a Manager?

Dr. Joseph G. Phelan, Ph.D.
Industrial Psychologist, Bechtel Corp.

Many company presidents can furnish harrowing stories about lack of executive ability in supervisors. They talk of similar lacks in higher supervisory levels, among vice-presidents, among directors, among board chairmen. Even, they say, crucial breakdowns in effective leadership occur among presidents themselves.

And these at a time when executive ability is needed probably more than ever before. The interrelationships and complexities of modern business structures all call for organizing and integrating ability of the highest order; have created the greatest need in all history for good executives who can get people to work together as a team instead of at cross purposes.

In some fields, it is possible to lead successfully through intellectual ability alone. But studies establish that this is not enough to administer a large organization. Neither is administrative skill only. Ability to handle people isn't enough if these other qualities are lacking.

The personality of the leader sets him apart from other people. Others look up to him, they will follow him, they have confidence in his judgment, they will submit voluntarily and eagerly to his direction.

A number of research teams have surveyed executives to determine what qualities make the difference between success and failure in a management job. It has been determined that executive leadership—the kind of leadership it takes to manage an organization—is different from other kinds of leadership and more exciting.

These add up to the following characteristics of executives:

• **Dynamic drive:** Executives must be strongly motivated. Management's job is to make sure that every manager at every level has a target to shoot at—something to hold their interest and to challenge their enthusiasm. Good managers have a skepticism with things as they are, an urge to stay ahead, to do better, to do more ambitious things.

Management studies of late have put much stress on the *way* the executive gets things done, how he organizes, delegates, schedules, selects and trains, and in his knowledge for organization and detail. But without the urge to forge ahead and do new things, a manager simply becomes an administrator and might end up administering the company right into the red.

• **A Sense of Responsibility:** The executive feels a definite responsibility for the achievement of the company's immediate and long-range goals. He always tries to be on target. At the same time, he feels a responsibility for the people under, around and above him. He wants to live up to their expectations and to exceed them. For these reasons, others find him a "dependable person."

• **Ability to Delegate Authority:** Studies have indicated that failure to delegate is a main cause of managerial failure. A young man gets an idea that nobody else can do the job as well as he, so he cannot assign the responsibility. This is a common failing among salesmen who have been promoted to sales managerships. They try to go right on doing all the selling.

Often a failure to delegate is based on inability to understand others and inability to train. It is necessary to begin by training in and assigning minor jobs, and then stepping up the level of difficulty of the assignment. Trying to teach

(Continued on page 102)

Check Your Score on the Management Test, Page 14

1. False	6. False
2. True	7. True
3. False	8. True
4. True	9. False
5. False	10. False

Consider

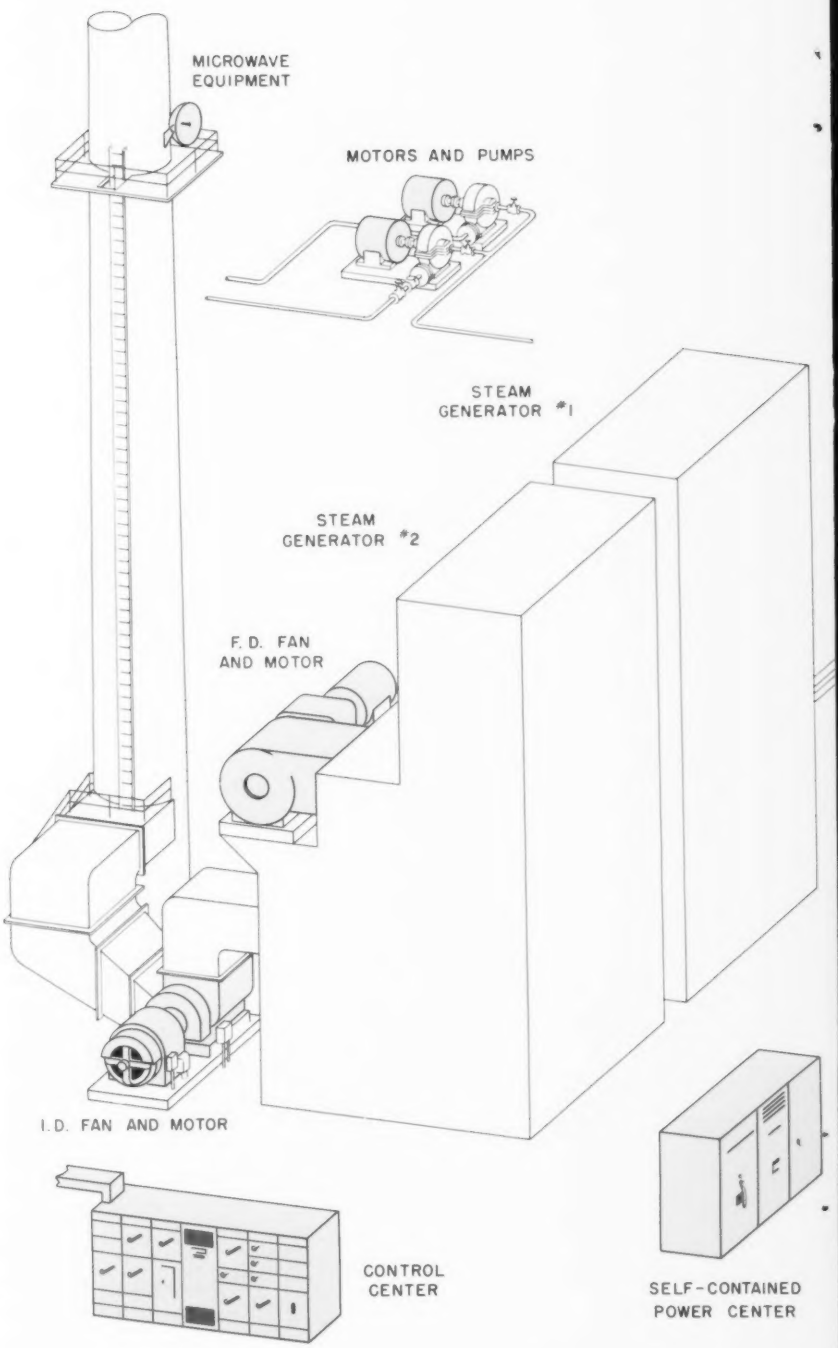
the advantages of one responsibility for your next power station!

Tom Fort, Vice President,
Apparatus Division,
Westinghouse Electric Corporation

Westinghouse apparatus available for power plant applications

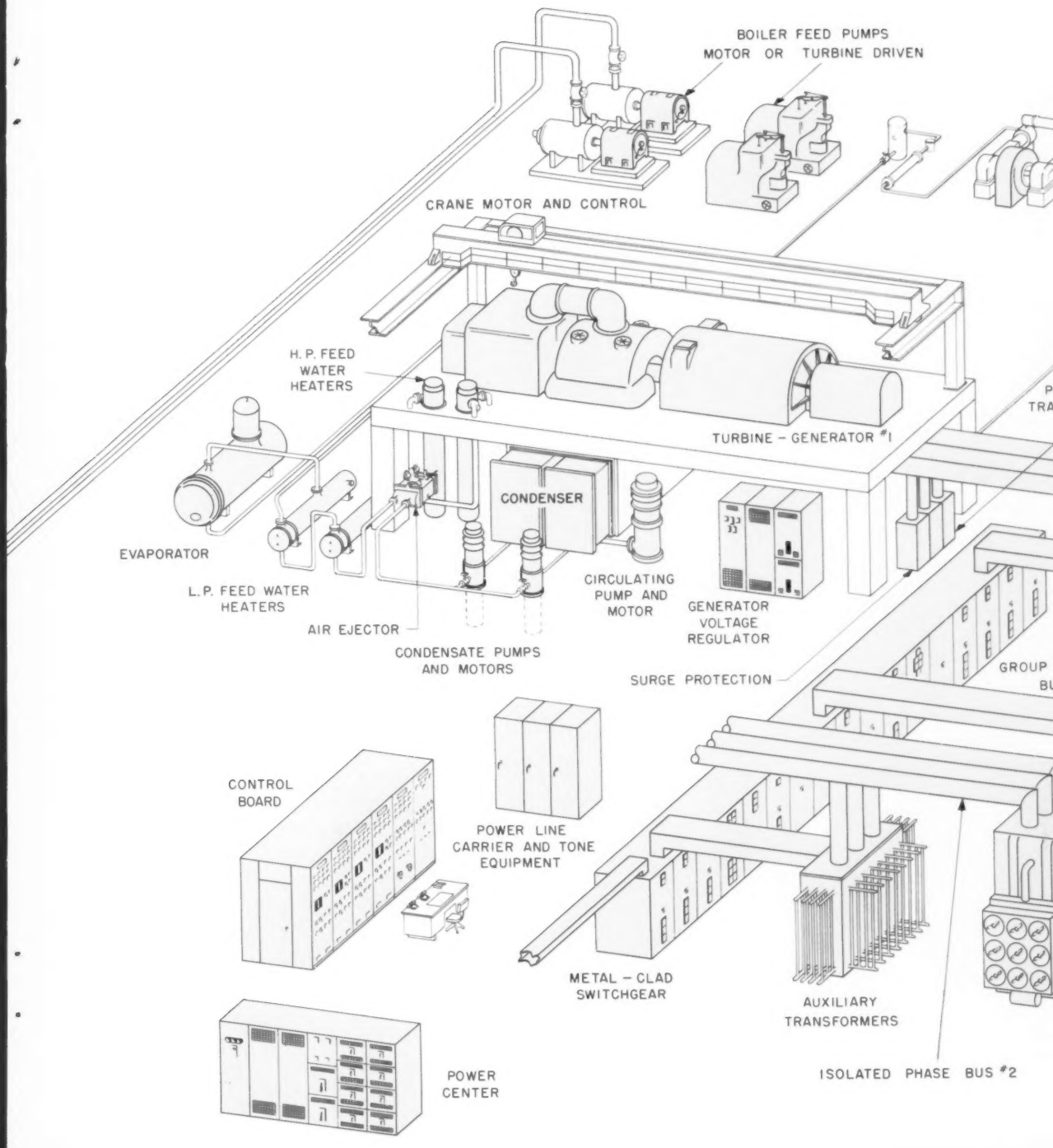
Air Conditioning Equipment
Arc Welders
Atomic Reactor and Auxiliaries
Automatic Dispatching Equipment
Battery Chargers
Bus Duct
Circulating and Condensate Pumps
Control Boards
Control Centers
Coupling Capacitors, Line Traps and Potential Devices
Crane Motors and Controls
Cypak* Annunciators
Disconnecting Switches
Elevators—Passenger and Freight
Evaporators
Fans
Feedwater Heaters
Gear Speed Increasers
Gear Speed Reducers
Generators, Main and Auxiliary
Generator Voltage Regulator
Group Phase Bus
Instruments
Instrument Transformers
Isolated Phase Bus
Lighting Equipment
Lightning Arresters
Meters
Microwave Equipment
Panelboards
Precipitron®
Power Centers
Power Circuit Breakers
Powerhouse Motors
Power Line Carrier and Tone Equipment
Reactors, Current Limiting
Relays
Self-Contained Power Centers
Standard Motor Controls
Steam Condensers
Steam Jet Air Ejectors
Supervisory Control
Surge Protection Equipment
Switchboards
Switchgear
Switchyard Structure
System Grounding Equipment
Telemetering Equipment
Transformers, Main and Auxiliary
Turbines, Steam or Gas, Main and Auxiliary
Unit Heaters
Ventilating Fans
Water Coolers

*Trade-Mark



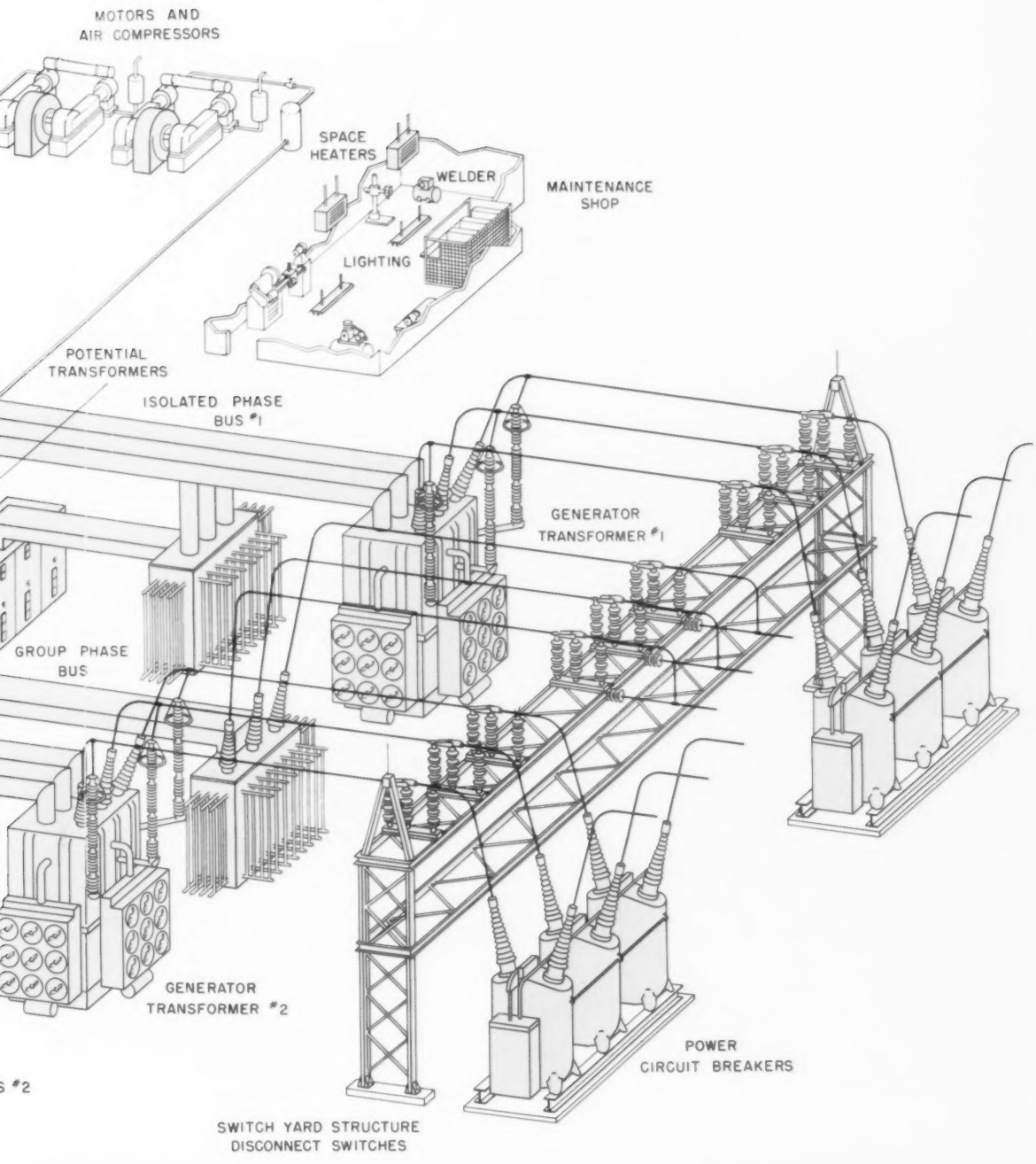
IED
ER

ONE ORDER, ONE CONT



A print of this artwork, suitable for framing, is available free of charge, write Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa.

ONTACT, ONE RESPONSIBILITY



Westinghouse can supply all this powerhouse equipment

Think of the time, trouble and processing you can save with:

ONE ORDER
ONE CONTACT
ONE RESPONSIBILITY

YOU CAN BE SURE...IF IT'S

Westinghouse

When you place an order with Westinghouse you take advantage of a unique organization

FOREMOST IN RESEARCH

Westinghouse research leads the industry, probing for new knowledge.

FOREMOST IN DEVELOPMENT

Product development is the practical application of Westinghouse research.

FOREMOST IN ENGINEERING

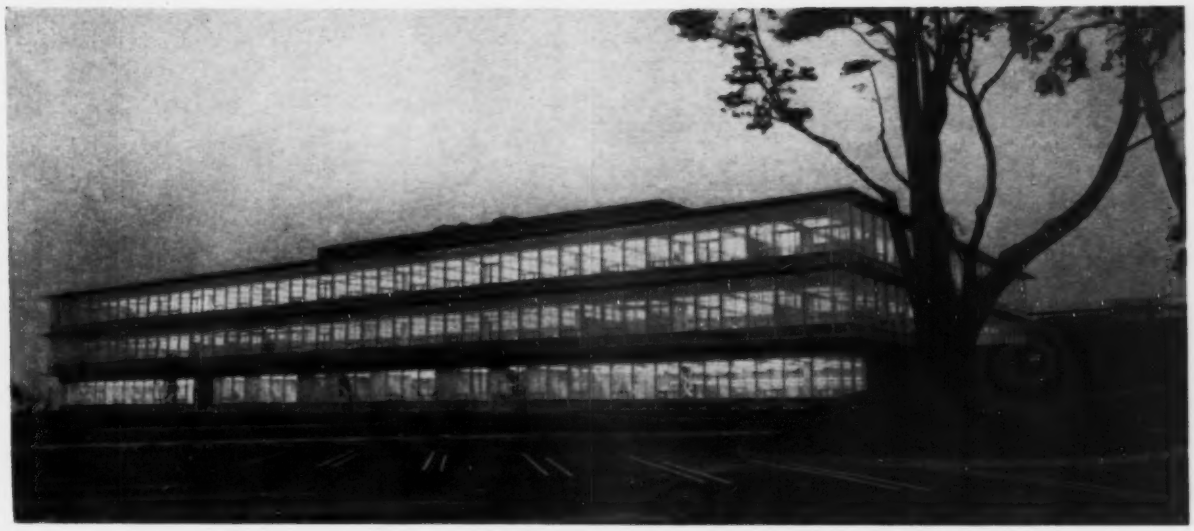
Noted for engineering excellence, Westinghouse has a depth of experience that can be gained only through years of *living* the problems of the electrical industry.

IT'S ALL ONE

The broad scope of Westinghouse stands ready to cooperate with you and your consultants. Your orders to Westinghouse not only take advantage of all this research, development and engineering, they support it, too. One man, your local Westinghouse representative, is your key man to it all. CP-1041

YOU CAN BE SURE...IF IT'S

Westinghouse



Where "a thousand people work all day with papers" at San Francisco Fireman's Fund headquarters building . . .

Light Is the Prime Consideration

Because seeing is most important in the processing of paper work and the business of insurance is so largely one of paper processing, Fireman's Fund Insurance Co., in building its new San Francisco headquarters office plant, approached it as a factory does its production line. Instead of building a structure and fitting its procedure into it, the building was built around the functions to be performed there. Because these involved seeing so accurately, Architect Edward P. Page made lighting the prime consideration.

The result is a remarkable structure whose ceilings are almost completely areas of well controlled light that make the processing of insurance, fine print and all, a comfortable task to the 1,000 employees, according to Fred H. Merrill, vice-president. Equally remarkable is that the 195,000 sq ft of floor space cost only $4,500,000, making it one of the least costly new insurance buildings in America.

In the lighting design, Page credits the counsel of John Walsh of PG and E and the research of Dan Finch, University of California, for the luminous ceiling. It consists of panels of white painted, steel, egg-crate panels suspended below parallel rows of single slimline lamps below an acoustical ceiling, also painted white. What makes it different is that the slimlines are shielded from below by half circles of translucent plastic that diffuse the direct light downward and reflect a large por-

Executive offices of Vice-president Merrill and President Crafts employ two decorative treatments

All large office areas have special louverall ceilings where slimlines are shielded above the metal louvers

tion to the ceiling to be bounced back down through the louvers. Hence, specular reflections on desks or shiny objects are eliminated. No direct view of the lamps, even looking straight upward, is possible. The design was developed by Finch by research and testing of mock-up designs in the university's field laboratory in Richmond.

The fixtures were made by Columbia. Installation of lighting was made by the electrical contractor, Ets-Hokin & Galvan, and the metal louvers by United Lighting & Ceiling Co.

Equally important, the color and reflectances of all surrounding surfaces were diligently insisted upon by Architect Page. All furniture is finished in light pastel tones, office machines as well, floors, wall and venetian blind surfaces too. The resulting environment is varied enough to prevent monotony and yet well within the recommended ratios of brightness in all lines of vision.

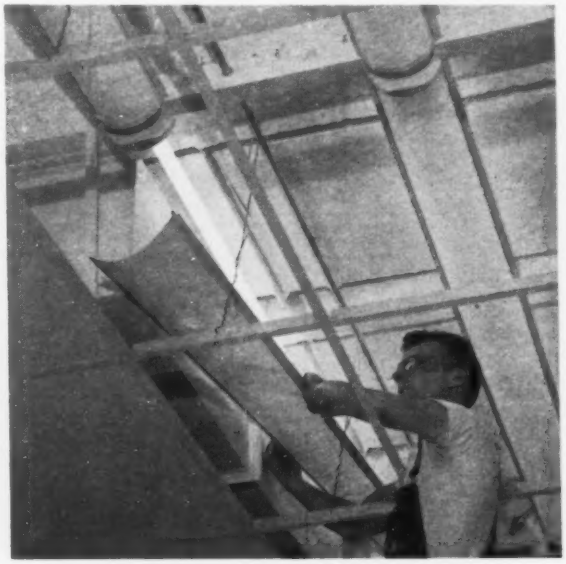
Power Supply

Electrical Engineer Clyde Bentley incorporated recommendations of General Electric distribution engineers as to equipment and principles. The high-voltage portion includes a 12-kv entrance panel, a 12-kv main line breaker panel and two 12-kv feeder panels, all metal-clad, with draw-out-type breakers.

The 12-kv power is supplied over the two high-voltage feeders to five unit substations varying in capacity from 225 kva to 1,000 kva. Their combined capacity is 2,975 kva. Secondary voltage of two of the subs totals 1,750 kva at 480/277 v. For the other three, it totals 1,225 kva at 208/120 v.

Each substation comprises an entrance panel with fused interrupter switch, transformer section, a main secondary breaker and several feeder breakers. Feeder breaker sections include an unused extra position to

Sound and heat vents and sprinkler heads above louvers



Half cylinders of translucent plastic mask bare tubes

Main substation room with three unit subs at load center

Motor control center at substation 5 in boiler room

accommodate additional loads that might develop in the future.

The feeder circuits carry power to five circuit breaker-type distribution panels, two located on each floor and one in the basement. The 277-v power for fluorescent lighting is distributed from these panels as also is the 120-v power for the portable equipment and private office lighting.

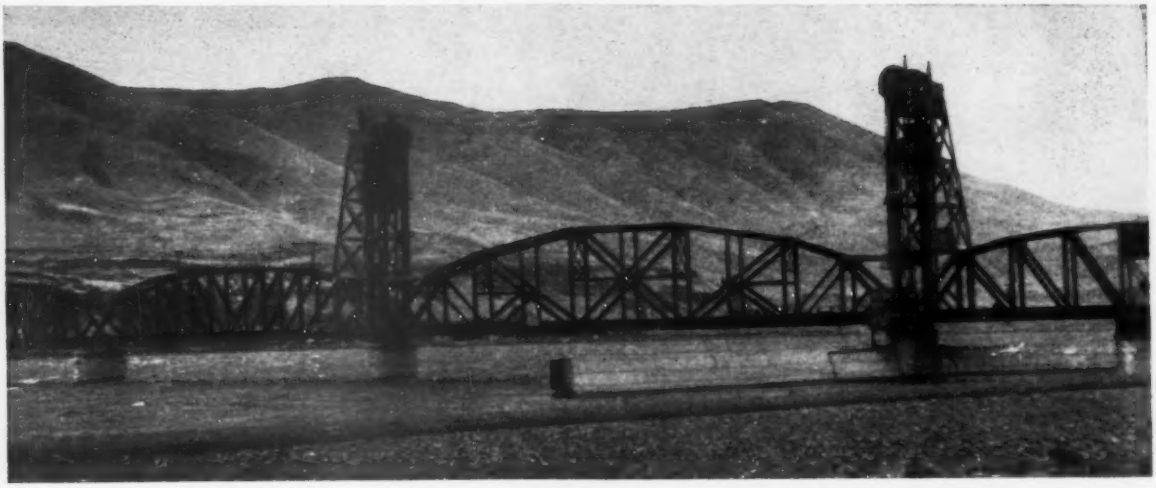
Electrically the building is the first major structure in San Francisco to utilize a 480/277-v system for lighting and power and total air conditioning. With the lighting heat load and that added in summer from the vast glass expanse, 500 hp of refrigeration compressors, in two 250-hp units, was installed.

Lighting data, measured at night without outside light, in the large direct-indirect fluorescent louverall ceiling area were: Intensity, center of room under louverall 72 f-c, under acoustical tiled section 60 f-c, 12 ft from window 52 f-c, 4 ft from window 33 f-c. Greatest brightness, plastic diffuser over lamp, 250 f-l; acoustical tile at top of plenum 220 f-l; 30° cutoff to louver 37 f-l; desk tops 33 f-l; tile floor 25 f-l; blue-green metal partitions 20 f-l. Reflectances were: desks and cabinets 40%, floor 37%, upper wall 35% and lower wall area 19%.

Wiring space in cast-in floor channel

Designers and installer—N. A. Bergovich, Fireman's Fund, E. B. Page, architect, F. N. Blum, G-E, C. E. Bentley, consulting engineer, J. M. Ets-Hokin, contractor

Switch legs and receptacle circuits for small office in between wall panels



New lift span of Celilo Bridge over Columbia River. Control house is at base of south tower, shown at the left

Provide Celilo Bridge Span Control

Trains had to be kept moving uninterruptedly, yet Celilo Bridge over the Columbia River near Wishram, Wash., on the Oregon Trunk Railway line, had to be altered very materially. Whereas once it stood high above the Columbia River, high enough for shipping traffic to pass underneath, now the waters backed up at The Dalles Dam brought the level closer to the bridge deck. To maintain navigation it was necessary to convert the bridge to a lift span.

This in turn required erection of two towers, installation of electrical equipment to lift and lower the span. In order to make both ends lift in synchronism an unusual job of mounting control cables and power cables across the river on the tops of the two towers was effected.

Emory & Bohm Electric Co. of Portland received the contract in February 1956 and the job was done March 1, 1957, involving considerable re-engineering and also adjustment of the installation to conditions that arose during the progress of the job. The work was further complicated because the consulting engineers were located in Kansas City and New York.

The usual "saving" or "murder" clauses put the responsibility for checking the plans and making of changes upon the contractor at his own expense. Despite these handicaps, the job was done expeditiously without interference to the rail traffic over the right-of-way.

The lift span, an operating machine in itself, was the heart of the project. To guarantee operation at all times two sources of power from central stations were connected and an emergency gasoline engine generator set provided for stand-by.

The span is set between two towers and supported from them. It is counterweighted and suspended by wire ropes passing over sheaves at the tops of the towers. The two sheaves on each tower are rotated by two electric motors working through gears, cross shaft and gears on the sheaves. Motors for the two towers are synchronized electrically to keep the span level during raising or lowering.

The emergency set operates through its own motor and gear train. Either supplied from outside or from the emergency set, power is provided also for electric brakes, man-lift and lighting. All operation is controlled in an operator's house mounted on one of the towers.

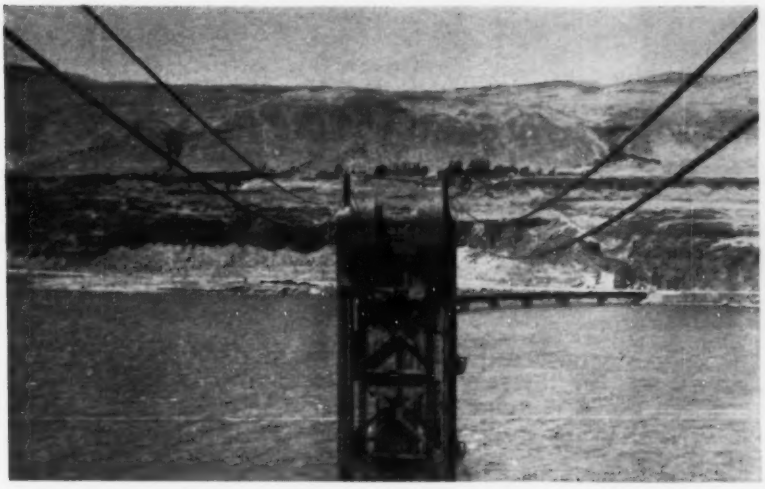
The normal power source is Pacific Power & Light Co. which brings its lines to a substation on the west side of the track beyond the south abutment. Here a 225-kva transformer furnishes the bridge 480-v, three-phase, 60-cycle, three-wire service. This service is carried underground in duct and metal conduit to the south tower, then up the tower to the panel in the machinery house where it is continued aerially to the panel in the north tower machinery room. From the bus in each tower connections are made to the motor generator set, emergency drive motor, brakes, span lock motor and other equipment. Both the power cables and the control cables are carried by messenger-supported aerial construction across the river to the north tower. From the switchboard in the north tower the bus is continued to the air circuit breaker in the load center unit substation where the stand-by service terminates.

The Klickitat County PUD from Wishram, Wash., provides the stand-by service to the north tower. It, too, is of 225-kva rating, 12-kv to 480-v secondary. The interrupter switch on the incoming lines is group operated, three pole, single throw, 15 kv, 600 amp continuous. It is key interlocked with the low-voltage breaker and has an interrupting rating of 100 amp at 15 kv.

The third source is the gasoline engine generator set in the engine room of the operator's house. It is controlled by contactors on the control desk.

Special Handling Required

Both the power cable and the signal and communication cables required special handling because of their size. The signal cable contains 61 conductors with seven No. 8 wires and 54 No. 14 wires. The communications cable had 27 pairs of No. 16 wires. The electrical contractor was responsible for providing the term-



Aerial cables swung between towers. North tower motor house at top of structure

inal boxes, hangers, junction boxes, conduits and cables. The railroad signal department made the connections to the terminal boards at each end.

While the main secondary power cables from the substation to the terminal board in the tower machinery house were three single conductors each 500,000 cm, the cable extending between the towers on messengers was a single cable containing three conductors, each 500 mcm. The messenger cable was extra high strength Copperweld.

Span operating machinery is driven by two heavy-duty armored, mill-type, direct-current motors operated from a motor generator set in combination with a control generator exciter. One complete set of equipment is provided in each tower. Normal operating time of raising or lowering is 1½ minutes. With the emergency drive coupled to the drive span the low-speed gear train is used and the operation takes approximately 7½ minutes.

The motor armatures are in series and are directly connected electrically to the armature of the adjustable voltage generator driven by a squirrel-cage type induction motor. Control is provided for a speed range of 20 to 1 in six selected steps, from the master controller on the control desk.

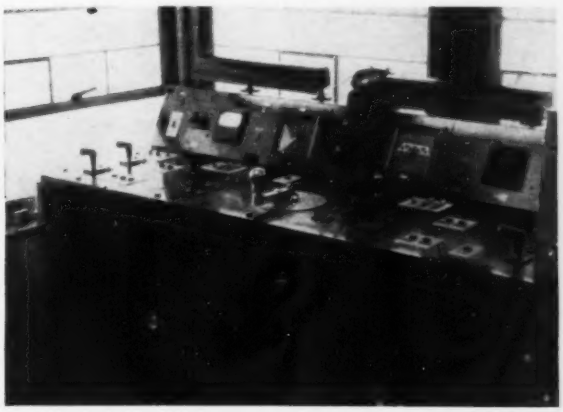
The motor field winding is excited from a constant voltage exciter generator which is a part of the main motor generator set. The motor generator set is located below the tower machinery room. Its starter, circuit breaker and control components are located in the tower machinery room. The necessary span control limit switches, skew limit switches, span height and skew transmitter selsyns and brakes are mounted in the tower also. A cabinet enclosed control panel is located in each tower to contain the necessary contactors and relays for the brakes, emergency drive, locks, man-lift and span control not required on the control panel in the operator's house.

The span position is continuously indicated to the operator by a selsyn-operated indicator mounted on the control desk. The indicator has two hands, rotating at 10 to 1 speed difference, one shows total span height in approximately 300'.

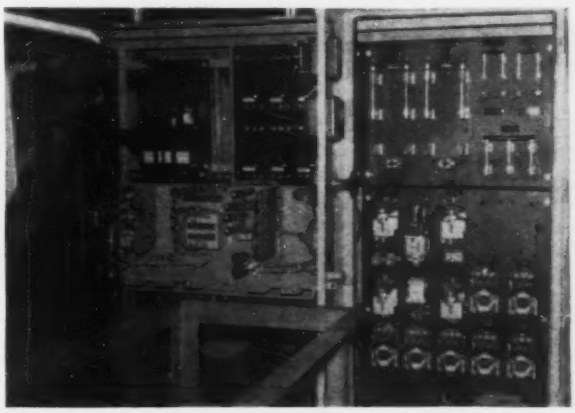
Emergency operation of the span is driven by a squirrel-cage induction motor in each tower. Control circuits are so arranged that the motors may be operated from either the normal, the stand-by or the emergency power supply by a power selector switch at the control desk. The drive motors are simultaneously controlled magnetically and automatically maintained in synchronism from a cabinet enclosed panel in the machinery room in the south tower head. This is responsive to control push buttons on the operator's desk and automatic leveling relays located on the control panel in the tower machinery room.

To show the operator whether there is any tendency of one end of the span to get ahead of the other, a span skew indicator is mounted on the operator's desk. This permits alignment by means of skew adjusting control push buttons. Skew limit switches are provided to stop the span operation before excessive skew develops.

Also of interest are the brakes. Three thrustor-operated, spring set brakes are provided in each tower for controlling and holding the span. One of these is mounted on the main machinery shaft, the other two, designated as motor brakes, are mounted on the shafts of the main

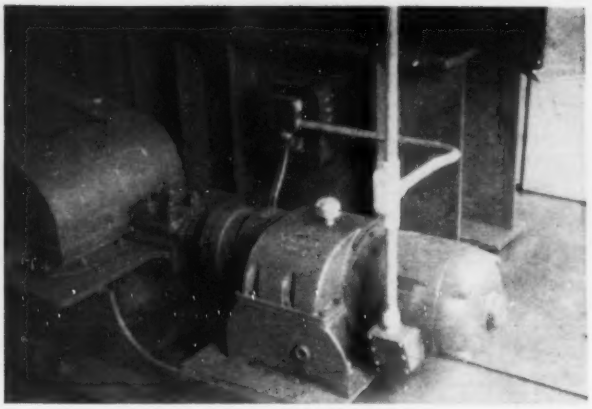


Main control desk located in south tower control house



North tower control panel; Rototrol, Magamp devices

Two of the 33-hp d-c drive motors and shaft brakes



One 7½-hp a-c emergency drive motor and gear train

driving motors. The same brakes serve both for operation with the main motors and for operation with the emergency motors, utilizing different sets of contactors. The thrustors hold off the brakes while power is applied.

Limit switches are also provided to break the motor circuits and apply all brakes when the span passes the "nearly closed" and "nearly open" positions. From then on a knee-operated by-pass push button is used by the operator to completely close or open the span.

The two main driving motors in each tower are 33-hp, 650-rpm, 230-v d-c motors. The emergency driving motors are 7½-hp gearmotors, 440 v, three phase, 60 cycles, 125-rpm output speed.

The two main motor generator sets, one in each tower, consist of a squirrel-cage induction motor, four-pole, 125-hp, 1,800-rpm, 440-v, three-phase, 60-cycle motor directly connected to a d-c generator, four-pole, 75-kw, 1,800-rpm, 550-v, separately excited, shunt wound generator and a constant-voltage exciter rated 3 kw, 1,800 rpm. In addition, two control motor generator sets, one in each tower, are provided. They consist of a 2-hp squirrel-cage motor driving a 1.5-kw control generator.

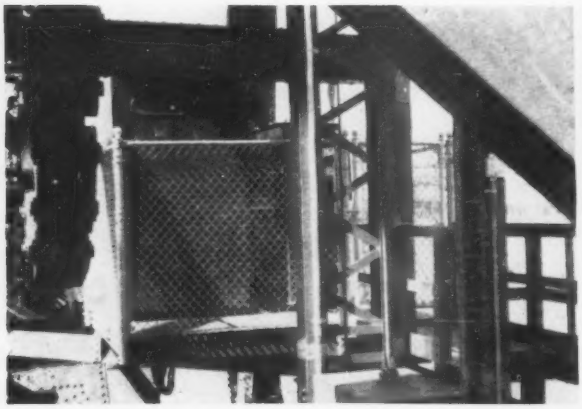
Electrical Details

Among the other numerous electrical details are an electric man-lift and use of electric cable on the water pipe system to keep it from freezing. Each tower has an electric man-lift to accommodate one or two men. It is driven by a ¾-hp gearmotor of the worm type. Brakes are likewise provided. The gearmotor is controlled from the car by making or breaking light beams and from landings by raise and lower push buttons. Stops can be made at five landings between track level and the machinery floor of the tower hoods.

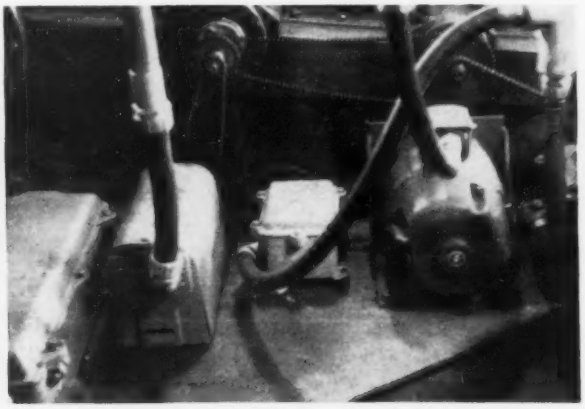
To protect the water pipes from freezing electric heating cable is spirally wrapped along the length of the pipe from elevation 170 to elevation 140. Over the pipes and cables a 2-in. serving of glass cloth and tapes is applied for insulation. Electric heating cables are 400 w, 115 v. A cartridge-type waterproof thermostat automatically switches the heating cable. It is located inside the pipe encased in a plastic case.

For accurate control the regulated adjustable voltage system of Westinghouse is employed. This incorporates its Magamp or magnetic amplifier and its Rototrol multifield d-c exciter. A span skew control transmitter is coupled to the tower machinery. These transmitters are two-pole synchro motors with a three-phase stator and a two-phase rotor. Any difference in skew is therefore transmitted to the control desk where the operator can correct it. In operation the leveling is automatic in this device.

Kansas City Bridge Co. was the general contractor for the job. The consulting engineers were Howard, Needles, Tammen & Bergendoff. C. F. Thomas was chief engineer for Oregon Trunk Railway.

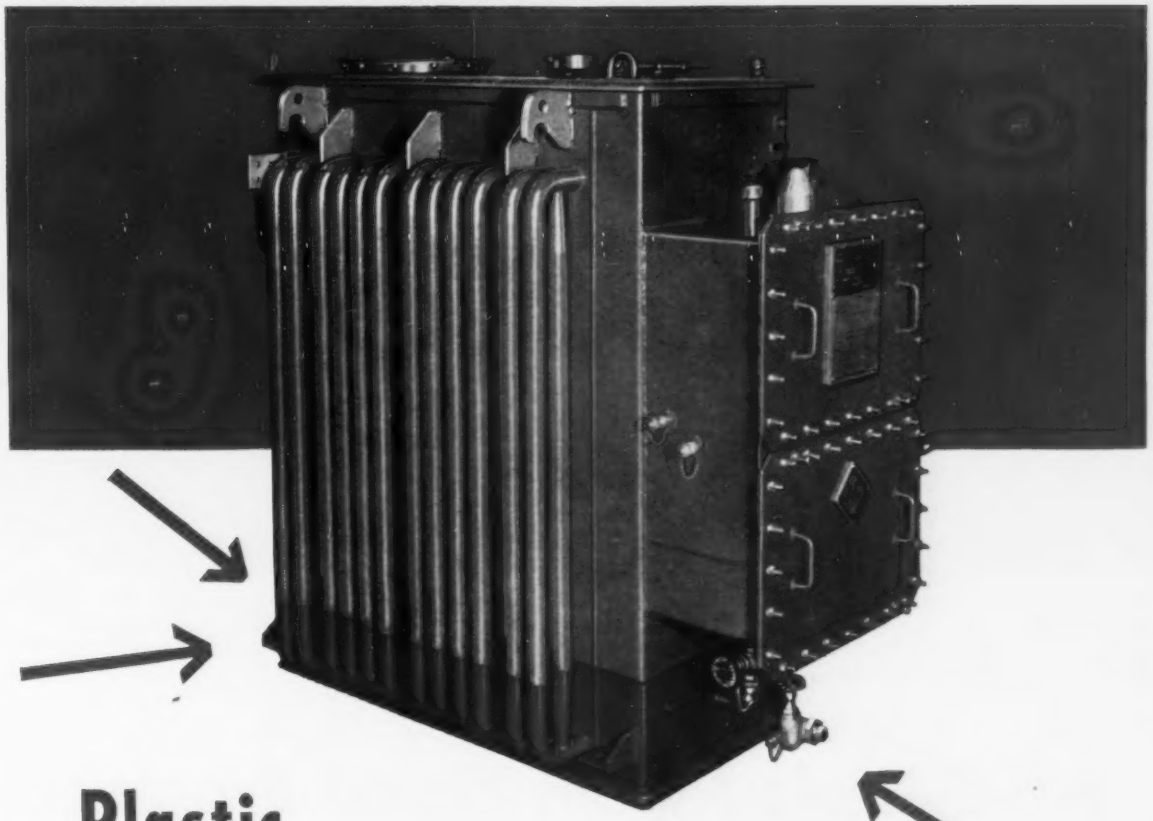


North tower 225-kva, 12-kv/480-v, three-phase substation



Span and skew limit switches and Selsyn transmitters

Allis-Chalmers Network Transformers



Plastic Jacket protects bottom and lower walls against corrosion

An extra measure of protection

In many locations, the network transformer often has to stand in inches of water from time to time. That's the very reason why Allis-Chalmers applies plastic compound on the bottom and a foot up the tank walls. Water can't seep through it. Destructive corrosion just can't get its teeth through this tough tar-base material.

Special overall protection, too

The overall surface treatment given an Allis-Chalmers network transformer is outstanding in itself. After grit-blasting and steam cleaning, tanks are given three coats of phenolic paint. Each coat is specially formulated to resist moisture . . . flowed on to assure complete coverage . . . baked on for permanency.

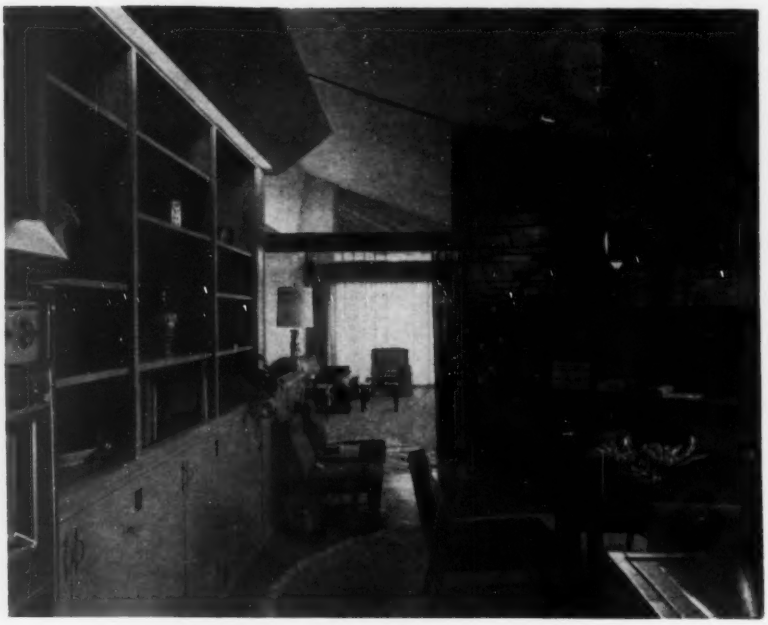
An extra measure of surface protection is just one of the many reasons why Allis-Chalmers transformers rate high with utilities and consultants everywhere. Get all the facts. Call your nearby A-C district office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

NATIONAL ELECTRICAL WEEK FEB. 9-15, 1958

A-5609

ALLIS-CHALMERS

Bob Callaghan, district representative, and Wayne Kingsbury, San Bruno manager, for PG and E, who worked with Builder Robert A. Nofziger (right)



Looking from the kitchen through the dining-family area toward the living room. Note electric oven, left, and communication system, right. The fireplace, which goes through to the living room, is accented by ceiling floods, with colored globes to bring out colors of the stones. Concealed lighting equipment is dimmer controlled.

All-Electric Model Home Promotes

Lighting, too often in the past a stepchild in model home promotions, is beginning to get some of the attention it deserves. This is coming about through the help of the industry and under leadership of electric utilities. An example is the Modelectric home built in the Robinwood subdivision of Millbrae, Calif., by Robert A. Nofziger of Capuchino Realty, first to take advantage of Pacific Gas and Electric Co.'s builder cooperative offer.

Under this new promotion plan, PG and E will contribute up to $250 in lighting equipment for model homes that meet AW Housepower or NAHB wiring standards and whose builders agree to keep them open to the public for at least 30 days.

200-amp Service

Nofziger's home more than meets the requirements, with a 200-amp main switch, 53 circuits, 258 electric outlets of which 102 are for lighting, more than 70 lighting fixtures costing some $2,500. An all-electric home built and furnished at a cost of $120,000, the house is not for sale. It will be used by Nofziger, first to show features that can be incorporated individually into less expensive homes and later to live in himself.

During the first two weeks it was open, 25,000 people inspected the home. As a part of the lighting promotion, PG and E is taking groups of from 15 to 50 through the house and explaining lighting features. The basement playroom, which has 300 sq ft of luminous ceiling in two 10x15-ft sections, is being used in these guided group tours as a small auditorium for talks and demonstrations. This 18x64-ft room has a foot-candle reading at night of 6 f-c 30 in. above the floor.

The home is a three-bedroom house with an 18x30-ft living room and a combined dining and family area 14x24 ft. The double fireplace is raised on the family room side to provide for an electric rotisserie unit.

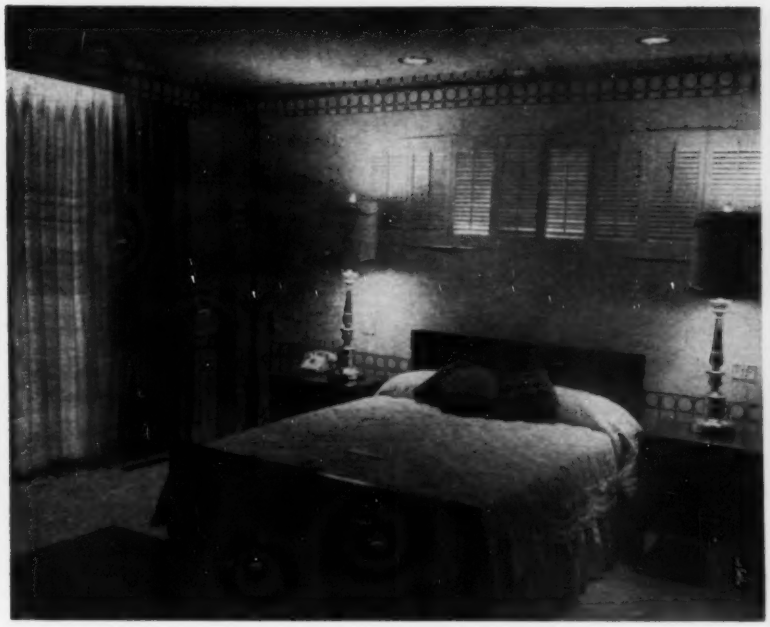
Cove fixtures in the living and dining areas and bedroom valances use 4-ft fluorescent tubes, dimmer controlled. Table lamps and spot lights give accent lighting. Spots over the beds are an aid to reading and, with colored globes over the fireplaces, bring out the texture and beauty of stone and brick. A combination fixture in each bathroom provides light, heat and exhaust.

Foot-candle readings taken after 7 p.m. showed lighting in the master bathroom to be 11 f-c. General kitchen lighting is 5 f-c, with 12 f-c over the stove top and 4 f-c over the sink.

Other Electrical Features

In the kitchen an electronic oven is installed beside a conventional built-in oven, and surface units are set into a counter that separates kitchen and family area. Sometime during the inspection period Helen Randol, Westinghouse home economist, will bring in a demonstration electronic oven for special showings.

An electronic air filter keeps down the dust even during the public inspection and each room has an out-



Valance lighting in bedrooms uses two 4-ft fluorescent tubes. Note spots and bed lamps for reading. One master panel in the bedroom controls light throughout the house. A second control panel is in the garage. Closets running the length of each bedroom have incandescent fixtures, with switches at either end for convenience

Bathroom lighting too is concealed with plenty of light on the mirror. The master bath has a sunlamp and also a combination heating unit and exhaust fan

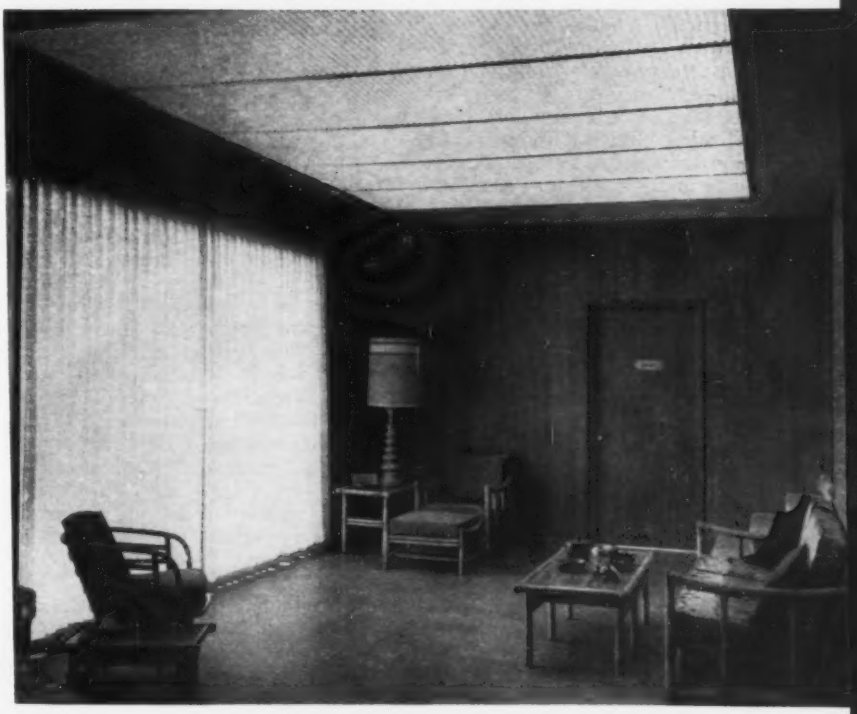
Light for Better and Safer Living

let along the baseboard for a central vacuum cleaner system that leads to a tank in the basement. The six filters reduce dusting time at least 50% and the vacuum tank needs emptying only twice a year.

Other electrical features include an intercommunication system, safety stair lighting, fire alarm system, lighted fish pond, electronic garage door opener and electric organ.

Lighting control is on a Remcon low-voltage system. Dimming equipment is by Superior Electric.

Nofziger plans to develop 25 adjacent lots and has options for 100 more lots in the area. For this first home at 75 Chadwick Court, Capuchino Electric was the electrical contractor. Among the PG and E people who helped with electrical features were Wayne Kingsbury, San Bruno manager, Robert Haskell, residential lighting specialist, and Bob Callaghan, district representative.



The basement playroom has 300 ft of luminous ceiling. This picture shows one of the two 10x15-ft sections

LBE Moves Ahead

(Continued from page 74)

show similar excellent sales results following aggressive promotion.

Medallion Home Program

The Live Better . . . Electrically Medallion Home Program inaugurated recently provides a marketing plan designed to change the buying habits of consumers profoundly by establishing, for the first time in the history of the electrical industry, a hallmark of excellence in electrical living. In time, the Live Better . . . Electrically Medallion will achieve an intrinsic value of its own and people will "look for this Medallion when they build, buy or rent."

The Medallion Home program is a vitally important new element in the Live Better . . . Electrically plans for 1958. Its pattern follows the already proven program of Live Better . . . Electrically, to provide a broad national framework, with utilities assuming industry leadership in their operating areas. It is patterned after the highly successful Bronze Award lighting and wiring program of Kansas Gas & Electric Co., but with the important plus factors of appliance minimums and national promotion.

National advertising and publicity with four-color full-page advertisements, plus television, will reach at least three out of every five families in 1958. Local utility, builder and other electrical industry advertising will assure that a Medallion Home message reaches every family.

Local Utility Sets Requirements

In each locality, the local sponsoring utility will be empowered exclusively to establish requirements and award bronze or gold medallions. Requirements will include appliances installed, lighting and wiring.

Requirements are completely flexible and should be designed to upgrade the electrical content of new homes reasonably, without stifling the awarding of a satisfactory number of medallions.

Medallion Home Objectives for 1958

For Bronze Medallions, 10% of the 1,000,000 new homes, or 100,000 is the objective.

For Gold Medallions, 2% of the new homes, or 20,000 is the objective.

In the West, where home building is progressing at a more rapid pace and where it has held up better, about 23.5% of the U.S. total or 23,500 Bronze Medallions are contemplated and 4,700 Gold Medallions.

The U. S. Department of Labor's compilation shows that 57.4% of the 1,118,000 new homes constructed during 1956 were built in 51 major market areas. The Los Angeles area was first in home building with 7.9% of the new homes and 11 of the 51 best home-building areas were located in the West as shown in the accompanying box. The estimated gold and bronze medallion objectives for these areas are also indicated.

Achievement of these objectives will assume a substantial increase in sales of appliances, lighting and wiring in 1958.

In the West, the awarding of 28,200 Bronze and Gold Medallions could mean the following *plus* business: appliances, an extra $20,000,000; lighting, an extra $3,500,000; wiring, an extra $4,100,000; residential kwh sales, an extra $4,800,000 per year.

These figures are of vital interest to electrical manufacturers, distributors, dealers, electrical contractors, utilities and home-financing agencies.

The Medallion Home Program is already well ahead of schedule, showing the interest and enthusiasm not only by the utilities but by builders and other allies as well. The original time table envisioned the first showing of Medallion Homes in April 1958, but on Oct. 16 Idaho Power Co. received the first authorized Medallion Home certificate and presented the first Gold Medallion to Frank Sherman, builder of the Boise Electri-Living all-electric home.

On Nov. 17 Salt River Power District, Phoenix, Ariz., cooperated with Woodburn & Sons Construction Co., builder of 85 homes in Mesa, Ariz., to present Gold Medallions for all of these homes. In Phoenix another tract of Gold Medallion Homes will be opened during National Electrical Week.

In Hawaii, the program struck fire immediately and plans have been completed for the opening of a tract of 100, possibly more, Gold Medallion Homes during National Electrical Week.

Many utilities have completed their requirements for Medallions and are readying industry meetings. In southern California eight utilities devised requirements suited to all. San Diego has made preparations for a strong promotion to break in mid-January.

Broad Framework

Starting its third year, Live Better . . . Electrically will again provide in 1958, the broad promotional framework for a continued all-industry program.

A questionnaire sent out to utilities indicated the majority favored a movie to use in telling the Live Better . . . Electrically plans for 1958 and tying in the utilities' own 1958 promotional plans. A 20-minute movie is available for utilities to use in their industry and employee meetings. It features Ronald Reagan and Fran Allison of Whirlpool, and tells the story of Live Better . . . Electrically in 1958 with the aid of key industry people.

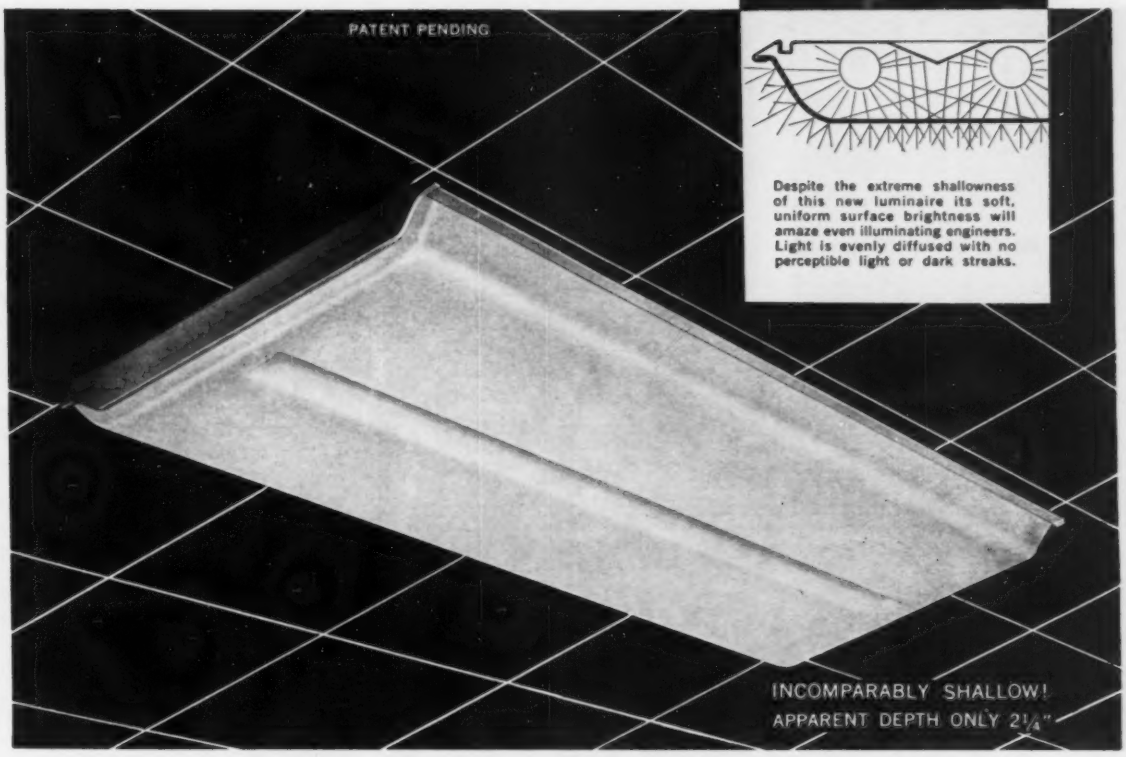
In addition to the Medallion Home, the 1958 program will feature: (1) National Electrical Week, Feb. 9-15; (2) Big Spring Push—March, April and May; (3) Big Fall Push—September, October and November; (4) Give Better . . . Electrically—November and December.

All promotions will be keyed in for timing to the EEI Residential Promotional Calendar. Much unity in 1957 was achieved through following this calendar.

Considerably strengthened national advertising will be used. To aid local promotions, new materials will be made available to utilities, including: new TV and radio commercials on Medallion Homes, electric ranges, laundry, portable appliances and freezer-refrigerators, promotional kits to tie in with the promotion of the month; special editions of Newspaper Masthead of Publishers Auxiliary; press kits; new exhibits; other sales aids.

The year 1958 is important to the utilities and electrical industry as a whole. That the "competition barrier" can be pierced has been demonstrated many times in many places in 1957. The goals are specific and have been established, the rewards are rich. Cooperation is the theme to meet successfully the challenges of the day, to assure that a justifiable portion of the consumer's dollar is spent on electrical living.

IT'S SURFACE MOUNTED—BUT LOOKS RECESSED!



Despite the extreme shallowness of this new luminaire its soft, uniform surface brightness will amaze even illuminating engineers. Light is evenly diffused with no perceptible light or dark streaks.

The Fixture Setting Amazing New Latitudes in Lighting

THE

SHALLORAMA®

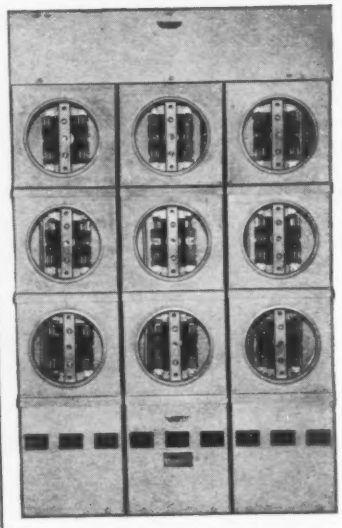
- 2- and 4-lamp units for widest range of applications; banks, institutional spaces, general or private offices, etc. Ideal for re-lighting.
- No latches, no hinges, no visible hardware. Installs lightning-fast.
- Diffuser opens on continuous hook-up supports by hand from either side.
- Fully enclosed by attractively contoured, micro-embossed, matte white Plexiglas, requiring minimum maintenance.

Sent for Bulletin 763-A yet?

SUNBEAM visionaire LIGHTING PRODUCTS

SUNBEAM LIGHTING COMPANY, 777 EAST FOURTEENTH PLACE, LOS ANGELES 21, CALIFORNIA
SUNBEAM LIGHTING CO., INC., 3840 GEORGIA STREET, GARY, INDIANA

THE LINE WITH THE GOLDEN TOUCH



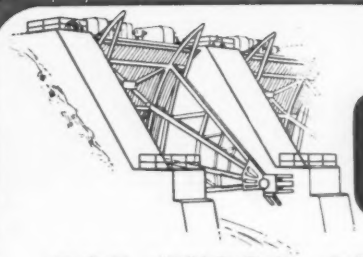
A COMPLETE LINE
of
Combination Meter
and Breaker Assemblies
for Multiple Apartments

5859 Compton Ave.
Los Angeles 1, Calif.
LUdlow 1-8231

BLAKEMAN ELECTRIC LOS ANGELES — B B — BROTHERS MFG. CO. INC. CALIFORNIA

Consult
Your Jobber

METER MOUNTING DEVICES • THAT'S ALL



FABRICATED
GATES
FOR HYDRO DEVELOPMENTS

Fabricating gates and other steel components for western hydro developments is a stock in trade at Gate City Steel in Boise. Interested? For full particulars or quotations, write:

GATE CITY STEEL

Box 1487 Boise, Idaho

Executive Offices: Denver, Colorado
Fabricating Plants: Boise, Idaho and Omaha, Nebraska

What Makes a Manager

(Continued from page 84)

men too much too soon can confuse them and discourages the teacher.

• **Ability to Acquire a Boad Knowledge and a Broad Point of View:** The tendency is for our training and experience to overspecialize us. We concentrate on knowing all there is to know about that particular phase of the business in which we are most interested. The special field might be some phase of engineering, sales, or accounting. This tendency is probably caused by the fact that a man must be tops in his own field in order to get the opportunity to become a manager.

Management at every level must spot potential leaders among the specialists and see to it that training is given to develop latent management talents.

• **Ability to Use Analytic Skills:** Problem solving is a vital skill in day-to-day administration. Few people seem able to gather facts, analyze them and come up with the answers. Some people inherently have the knack of getting to the core of the problem. Others get confused by the details or sidetracked in pro-and-con arguments. Successful executives chalk up a high percentage of right decisions by getting all possible facts; by avoiding snap decisions.

• **Ability as a Judge of People:** A man can build a winning team if he can pick winners. This is hard to do in an interview. It is easy to let emotions carry you away. If you find yourself liking the man, you overlook his limitations. But the limitations must be faced when he lets you down. This can be corrected by aptitude testing. Psychological tests do not provide all the answers, but they help to pinpoint strengths and weaknesses.

• **The Spirit of Teamwork:** Some executives never get to understand the mutual dependence of others on them and themselves on others. They get involved in empire building or in cloak-and-dagger corporation politics, which is disruptive of morale. Worse still some play favorites, develop fair-haired-boys, which is bad for morale of all employees.

Workers are not loyal by accident. A manager develops confidence by display of enthusiasm, fairness and loyalty to employees. The leader must have integrity, a high set of moral and business standards; he

must be sincere, show a depth and strength of feeling. His behavior must be consistent, he sticks to his standards regardless of pressure.

Leaders build teamwork and cooperation by letting subordinates take part in the leadership. A leader takes people into his confidence, shows them where he is going and why, gives them responsibility and power so they can help him reach his goals. He earns people's loyalty by being loyal to them. He stands behind their decisions because it develops their confidence and competence.

Because he has developed the knack of putting himself in others' shoes, he knows how they react in different situations and how to use these reactions to get them to do what he wants. He gets people to go along by making them want to.

• **Ability to Act Decisively:** A number of managers think they have to play it safe. They become very hesitant to "go out on a limb" or to "stick their necks out." They hate to take a positive position on almost any question. If they can find some way to avoid making decisions, they do so. There is merit, of course, in taking time to get the facts that will avoid making costly mistakes. Training in satisfactory problem solving, based on careful analytic thinking, makes the consequences of decision making less painful. After some experiences, young executives tend to lose the need to "play it safe."

• **Use of Administrative Skills:** In addition to personal leadership and intellectual ability, conscientious study of the mechanics of administration is required. Such concepts as methods of formulating company policy, industrial organization, planning and scheduling, and the controls of management, can be learned from books as well as from practices of competitors and colleagues.

The history of dynamic and successful industrial organizations reveals the presence of alert executives who kept asking: "What are we doing?" And "Is there a better way?" There are, of course, other factors that enter into management success. Discussed here are perhaps the principal factors—the ones that might be given consideration in any self-appraisal.

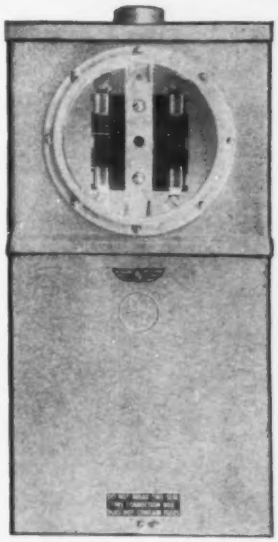
Like to know more about this subject? Suggested reading:

Organization Man, by William F. White, Simon & Schuster

Practice of Management, by Peter Drucker, Harper Bros.

Principles of Management, by H. D. Koontz and C. J. O'Donnell, McGraw-Hill Book Co.

THE LINE WITH THE GOLDEN TOUCH



A COMPLETE LINE

OF

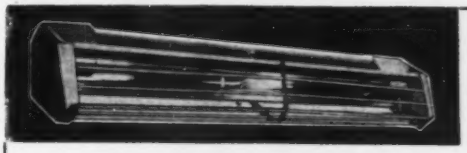
SAFETY SOCKET BOXES

5859 Compton Ave.
Los Angeles 1, Calif.
LUdlow 1-8231

BLAKEMAN ELECTRIC LOS ANGELES — BB — BROTHERS MFG. CO. INC. CALIFORNIA

Consult Your Jobber

METER MOUNTING DEVICES • THAT'S ALL



first time offered!

EXCLUSIVE DEALERSHIPS FOR

CAN-ARM

HEATING SYSTEMS

nationally-advertised
practical, economical
indoor or outdoor
industrial, farm
and Specialized Home Uses

this is the product featured in the November issue of Electrical West . . . pg. 117

Unlimited potential in a market virtually untouched! Silent! No maintenance! Also adaptable to specialized residential use.

address inquiries to:

HEAT INCORPORATED of SPOKANE
East 9 Empire
Spokane, Washington

Please send further information on CAN-ARM dealerships to:

NAME .....

FIRM: .....

ADDRESS: .....

CITY ..... STATE .....

news

Boats again can enter Grand Canyon! After four drought years during which power generation of Hoover Dam had to be cut as low as 62.75% of firm output, Lake Mead is up again and power allottees are receiving 100% of energy allotted to them by the original contracts. *(See Political Front)*

Transporting this 92½-ton G-E transformer over Siouxon Bridge caused anxious moments as Pacific Power & Light moved the unit to the Swift project. Wheels scraped both rails. *(See Growth)*

The new IBM 705 electronic computer of Pacific Gas and Electric is shown in operation at the recently acquired office building on San Francisco's Mission Street. Installation is largest of its type west of Mississippi. *(See Management)*

Machinist Ronald Staszkow handles the controls of a 10-ton electric crane in the new motor repair shop of Honolulu Electrical Products Co. The company's industrial division is equipped for motors of any size. *(See Manufacturers)*

EW

Growth

More Capacity

Initial installed capacity of Priest Rapids Dam on the Columbia River will be increased to 798,500 kw, as the result of a decision by the Grant County PUD of Ephrata, Wash.

The decision calls for the installation of two addditional generators, increasing the peaking capacity by 166,000 kw to 830,000 kw, said Manager G. A. Smothers. It is subject to formal approval by the 12 purchasers of Priest Rapids power, but most of these already have indicated they favor the new $7,000,000 installation, Smothers said.

The generators will be paid for from unexpended funds in the contingency fund, without the necessity of issuing additional bonds, according to Smothers. The original power house design included bays for the two extra generators, so no extensive change in plans will be necessary.

English Electric Co. Ltd., which has the contract to supply the first eight generating facilities, will build the two additional units at the same unit price, said Smothers.

► Douglas County PUD looks forward to spending approximately $4,000,000 in construction over the next 10 years to meet an estimated 50% increase in customers and 40% increase in kwh consumption.

► Grant County PUD plans to open bids Jan. 15 for construction of the Priest Rapids-Midway 230-kv transmission lines. The lines run from the power house substation 6½ miles downstream to the Bonneville sub.

► BPA and Idaho Power are negotiating toward an intertie and power exchange arrangement to carry out coordination between IPC's Snake River hydroelectric projects under construction and Northwest Power Pool. This is the first such contract required by FPC license. BPA is also looking at a "universal" wholesale power rate to replace the existing five wholesale rate classifications now in existence. Adoption will depend on "reaction of the customers." Also under consideration by BPA is a new proposed low availability interruptible rate. The proposed new rate for secondary power would be one mill per kwh during May, June and July, and two mills during other months. BPA also reported that the power outlook is more favorable than it was a year ago, with regional load forecasts about the same, but with more generation in sight.

CHEESECAKE ON THE ROCKS—P. L. Guthrie, assistant project manager at Noxon Rapids Dam, shows 18-year-old Lee Carry of Greece the construction work at the spillway section of the dam. Miss Carry, an exchange high school student from Greece, represented Greece in the Miss Universe contest

► Kermac Nuclear Fuels Corp. has let a $1,500,000 contract for construction of a privately owned power transmission line between Albuquerque, N. M., and Kermac's uranium processing mill in the Ambrosia Lakes area near Grants.

Kermac also has signed a contract with Public Service Co. of New Mexico, who will furnish power to the 70-mile, 115-kv line. Kermac is building a uranium processing mill in the Ambrosia Lakes area.

Phillips Petroleum Co. holds a one-third interest in the transmission line.

Contract to build the line was awarded to Mullinix Construction Co. of Oklahoma. The $1,500,000 covers only the transmission line and does not include stand-by power or booster stations.

► Start of the 168-ft-high spillway sent the huge project into the homestretch and marked another long step toward on-schedule completion next year of Brownlee—the world's second highest rock-fill dam. Some 1,800 builders are toiling on Brownlee with many phases of its construction being pressed forward around the clock to meet the region's urgent power needs.

The first of the mammoth dam's 90,100-kw generating units is slated to spin into action by October 1958 and all four units will be "on the line" by December 1958, producing the project's initial capacity of 360,000 kw of electricity for the power-hungry Pacific Northwest.

► PP&L has started construction on a new $1,000,000 substation to serve the Lloyd shopping center. Total capacity: 24,000 kw.

► Molokai Electric Co., Hawaii, celebrated its 25th anniversary recently (Nov. 15) with the announcement that it will move its office to larger quarters to make room for expansion of the power plant. Another generating unit will be added to the 3,000-kw plant.

Management

PG and E Gets 18-Ton Brain

An IBM 705 electronic computer has been installed by the Pacific Gas and Electric Co. at its San Francisco headquarters. The new machine, the largest of its type west of the Mississippi, is capable of turning out 100,000 customer bills a day and handling all related records. It operates at such a speed that nearly 2,000,000 customer bills per month can be processed with time left over for use in solving complex engineering and other problems.

The computer is housed in special quarters with its own climate control that maintains a constant 70 F and 50% relative humidity. After testing, the 705 will begin taking over billing for the San Francisco division of the company and by 1960 will be processing bills for all 13 of the company's operating divisions.

Utilities Ordered to Fight Raise

The California Public Utilities Commission ordered four of the state's utilities to vigorously oppose a rate hike imposed by the El Paso Natural Gas Co. The four companies, Pacific Gas and Electric, Southern California Gas, Southern Counties Gas and San Diego Gas & Electric Co., all buy natural gas from El Paso. They have been seeking an increase in gas rates to offset the increase in cost of imported natural gas.

The commission told the companies that, before any decision would be made on their application for rate increases, they would have to show that they have done everything possible to force El Paso Natural Gas to deliver at previously contracted prices. Such actions would include a protest before the Federal Power Commission and if necessary action in the courts.

Management Briefs

► California Electric Power has reached an agreement on a new 18-month contract with Local 543 of the IBEW. The new contract calls for an improvement factor wage raise of 4¢ hourly, an automatic cost-of-living increase of 1¢ hourly each quarter and an additional 1¢ hourly based on the cost-of-living index.

► High school students in Portland, Ore., are invited to prepare some kind of exhibit making use of an electrical principle or demonstrating an application of electricity at work. The Portland General Electric Co. in cooperation with the Oregon Museum of Science and Industry is sponsoring an "Electricity at Work Contest" as part of the celebration of National Electrical Week. Entries will be displayed at the company's service center auditorium on Feb. 8 and 9 and the top winner will be awarded a $500 college scholarship. The winning school will receive a 21-in. television set and the five runner-up winners each will receive transistor radio sets.

► Washington Water Power Co. has a dramatic example of at least one benefit of privately financed hydroelectric projects. Property taxes in Sanders County of western Montana where the company is building its multimillion dollar Noxon Rapids project, will enjoy tax decreases of nearly 10% as a result of the company's investment.

► Idaho Power has received a citation from the Department of Defense for outstanding cooperation with reservists and reserve activities. The company policy encourages its employees to participate in reserve activities and grants leave with pay for annual reserve tours of duty in addition to the employee's normal vacation. "A real assistance to the success of our defense effort," said a letter from the Secretary of Defense to T. E. Roach, Idaho Power's president.

► P. A. Blanchard has been elected vice-president in charge of engineering, construction and power production in personnel shifts at Utah Power & Light Co. following the retirement of George R. Corey, executive vice-president. Two other vice-presidents elected at the same time were D. L. Broussard, named vice-president in charge of finance and secretary of the company, and T. C. Woodside, who is the company treasurer.

► T. M. McDaniel Jr. has been elected a vice-president by the Southern California Edison Co. Bruce Renwick, formerly the general counsel, has been elected vice-president and senior counsel and is being succeeded as general counsel by Rollin E. Woodbury.

Financial Notes

► Pacific Power & Light has announced plans to sell $1,000,000 of first mortgage bonds and 100,000 shares of preferred stock with a par value of $100. Proceeds are to be used for system expansion.

► Tucson Gas, Electric Light & Power Co. is marketing 100,000 shares of common stock at a price of $28.50. The issue, which was originally planned for 200,000 shares, was halved because of the present unsatisfactory market conditions.

► Southern Colorado Power Co. is offering holders of its common stock the right to subscribe to $1,780,000 worth of 5½% convertible debentures due 1972. The established rate for the right is $100 worth of debentures for each 40 shares of stock held on Nov. 26, 1957.

Debentures will be convertible into common stock at any time after July 1, 1958, at the rate of $14.25 principal amount for each share to and including Nov. 30, 1962. Thereafter until Nov. 30, 1967, the conversion rate would be $15.25.

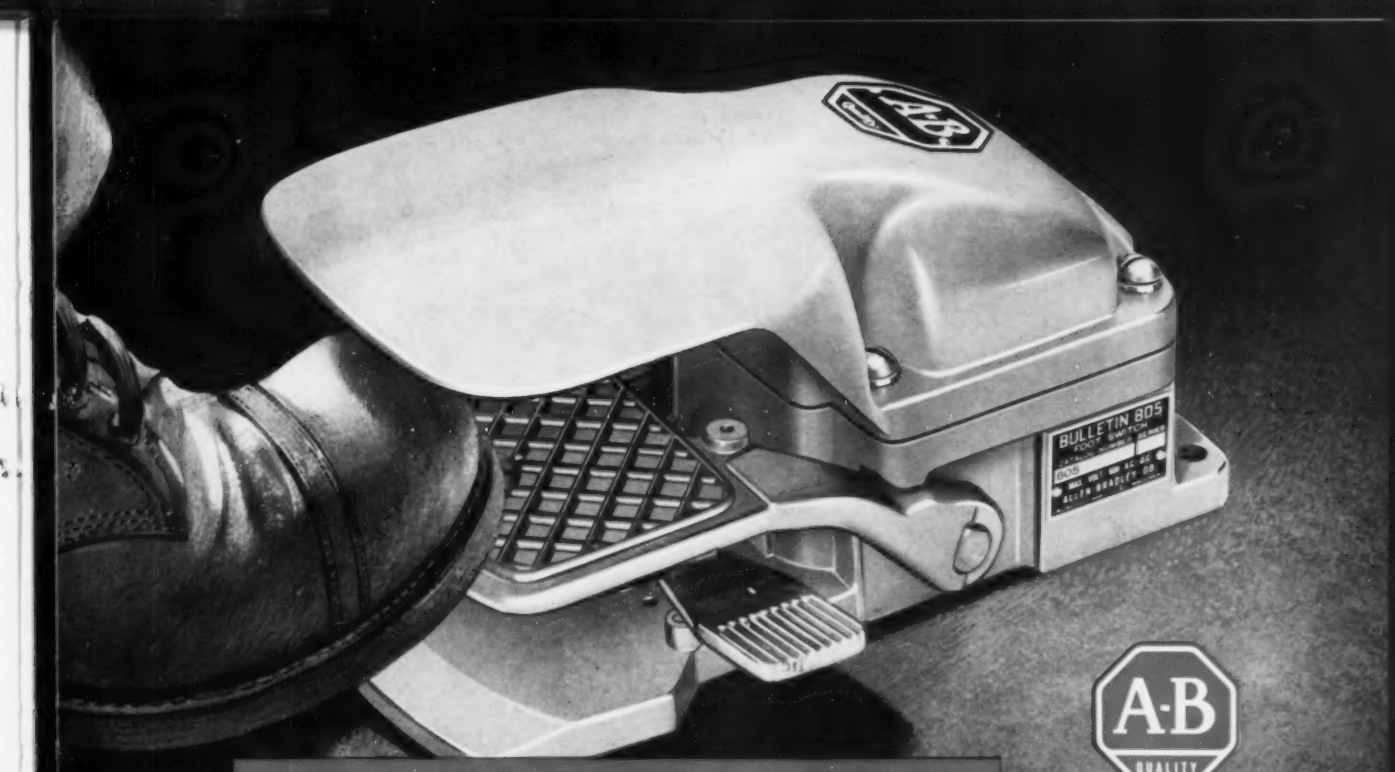
► Idaho Power Co. received FPC approval for marketing $15,000,000 worth of first mortgage bonds at 100.92% of the principal amount with a coupon rate of 4¾% per year. In mid-November the company was authorized to issue and sell 225,000 shares of $10 par value common stock at an initial public offering price of $31.50 per share.

Earnings

Federal Pacific Electric Co. reports sales of $12,146,760 and profits of $716,144 for the quarter ending Sept. 30. This is 72¢ per share of common stock after preferred dividend, as compared with 70¢ for the same period of 1956. A six-week Bay area strike substantially reduced sales and profits for the quarter.

Nine-month earnings of **Westinghouse Electric Corp.** were $49,102,000, equal to $2.83 a common share. Setting a new record, sales totaled $1,477,273,000 for an increase of 22% over the previous high in the first nine months of 1954. President Gwilym Price reports that backlogs of unfilled orders remain high, particularly in apparatus.

Packard-Bell reports record high sales of $32,262,878 for the fiscal year ended Sept. 30, an increase of 13.5% over sales of $28,405,059 for the previous year. Net income amounted to $704,447, or $1.02 per share on 688,000 outstanding.



FOOT SWITCHES that can take it!

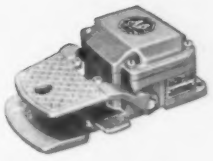
• **BUILT FOR THE TOUGHEST SERVICE** inside and out—from the maintenance free, snap action, double break, silver alloy contacts to the rugged, die cast aluminum housing—the redesigned Allen-Bradley Bulletin 805 foot switch is a challenge to tough jobs! The on-center treadle operation eliminates the need for bolting down the switch—the extended base keeps it from tipping.

• **VERSATILE OPERATION**—The contact trip point is easily adjustable. When equipped with two contact blocks, this foot switch can be set for simultaneous or two-stage operation. The Bulletin 805 foot switch can also be furnished with a latch to provide maintained contact operation. In addition, this latch, when desired, can be made inoperative, and may be quickly changed from one to the other side of the foot switch.

The Bulletin 805 housings are available for NEMA Type 4 watertight and oiltight applications, or NEMA Type 7 explosion-proof service.

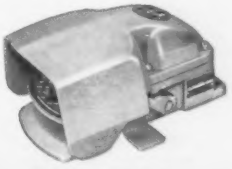
Try the Allen-Bradley Bulletin 805 foot switch—you'll find it "tops" in its field. Send for full information.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.



Bulletin 805 Style A switch with latch.

Bulletin 805 Style A switch with latch and top guard to prevent accidental operation.



Bulletin 805 Style A switch with latch and guard covering both top and sides.

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

1-58-MR

Husky

BULLETIN 801

LIMIT SWITCHES

IN A THOUSAND AND ONE TYPES

A-B
QUALITY
Roller lever type in watertight enclosure.
Cutaway view of Bulletin 801 heavy duty limit switch. Note the sturdy construction.
Roller fork type in watertight enclosure.
Lever type for rod or chain operation.
Push type, heavy duty switch.
Center roller, standard duty switch.
Switch with two independently adjustable rollers.
Fork type, snap action switch.

From among the hundreds of Allen-Bradley Bulletin 801 general purpose limit switches, you're sure to find your exact requirements. There are 21 different contact arrangements available, including types with single or multiple poles, N.O. and N.C. contacts, spring return or maintained contacts, with either a slow or snap action mechanism. It will pay you to know this *quality* line of limit switches. If you do not already know this quality line, let's get acquainted. Write for the complete story.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

1-58-MR

Market Development

Forecast Is Good

The major appliance business will be better in 1958, John W. Craig, vice-president and general manager of Westinghouse Appliance divisions, predicted during a tour of the West last month.

Craig, whose headquarters are in Mansfield, Ohio, visited the Mountain and Pacific Coast operations, with stops in Los Angeles, San Francisco, Portland and Seattle.

"Business in major appliances such as refrigerators, washing machines and electric ranges will be better in '58 because inventories are in a more balanced condition than they have been for the past two years," he said.

Prices "are better stabilized than they were a year ago because there are no large surpluses of unsold items in warehouses."

Craig predicted "additional price increases, keyed to match rising labor and material costs. I don't expect large price increases but there must be a realistic adjustment to higher costs."

He contended "because of overproduction and bad merchandising practices, prices of some key items are too low. A 9-cu-ft electric refrigerator sells now for less than it did in 1937. It's now priced around $199. But in 1937 it cost the consumer $249 to $299. Yet the present-day refrigerator is a superior appliance."

► Slightly higher price tags (3 to 5%) on 1958 models were forecast by other appliance manufacturers. Hotpoint's models, for example, will be up 3% due to rising labor and material costs.

What Else Are They For?

When, to pep up its dryer campaign, Portland General Electric Co. invited its customers to make dolls out of their clothespins, it didn't realize that some 5,000 entries were going to overflow desks, chairs, tables and filing cabinets in its advertising and public relations department offices.

Most entries had several dolls so that it is anyone's guess how many clothespins were retired from service. Among the winners was a fairy tale parade mounted on a 6-ft strip of plywood, with floats, princesses, clowns and marchers. Five dryers were given to the winners and all dolls were turned over to invalided and underprivileged children.

Mildred Kalmbach, PGE public relations secretary, can't be blamed for looking discouraged. This pile of boxes is just one mail delivery of clothespin dolls. Some 5,000 were received from customers in a two-month pre-Christmas contest

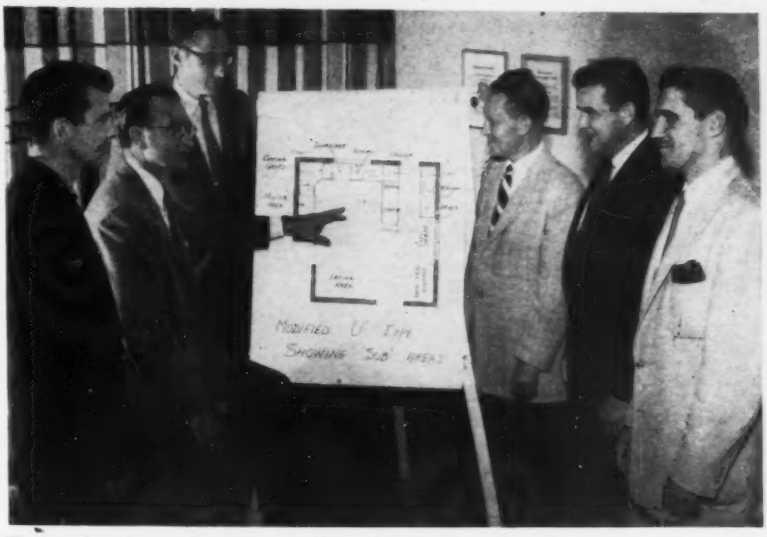
As a part of the dealer tie-in PGE conducted a weekly drawing, with a chance for every sale. Prizes were two suits a week and the sweepstake, a 16-ft boat with 40-hp outboard and trailer. More than 2,000 dryers were sold in the seven-week campaign period.

► **Edison Electric Institute** is offering 12 new sales promotion awards this year for exceptional achievement in building load in four markets: residential, farm, commercial and industrial. They take the place of previous EEI-administered awards concerned primarily with specific appliances and selective markets and follow the current trend to promote electric living.

There are three awards each in residential, commercial, industrial and farm market contests, based upon total number of customers.

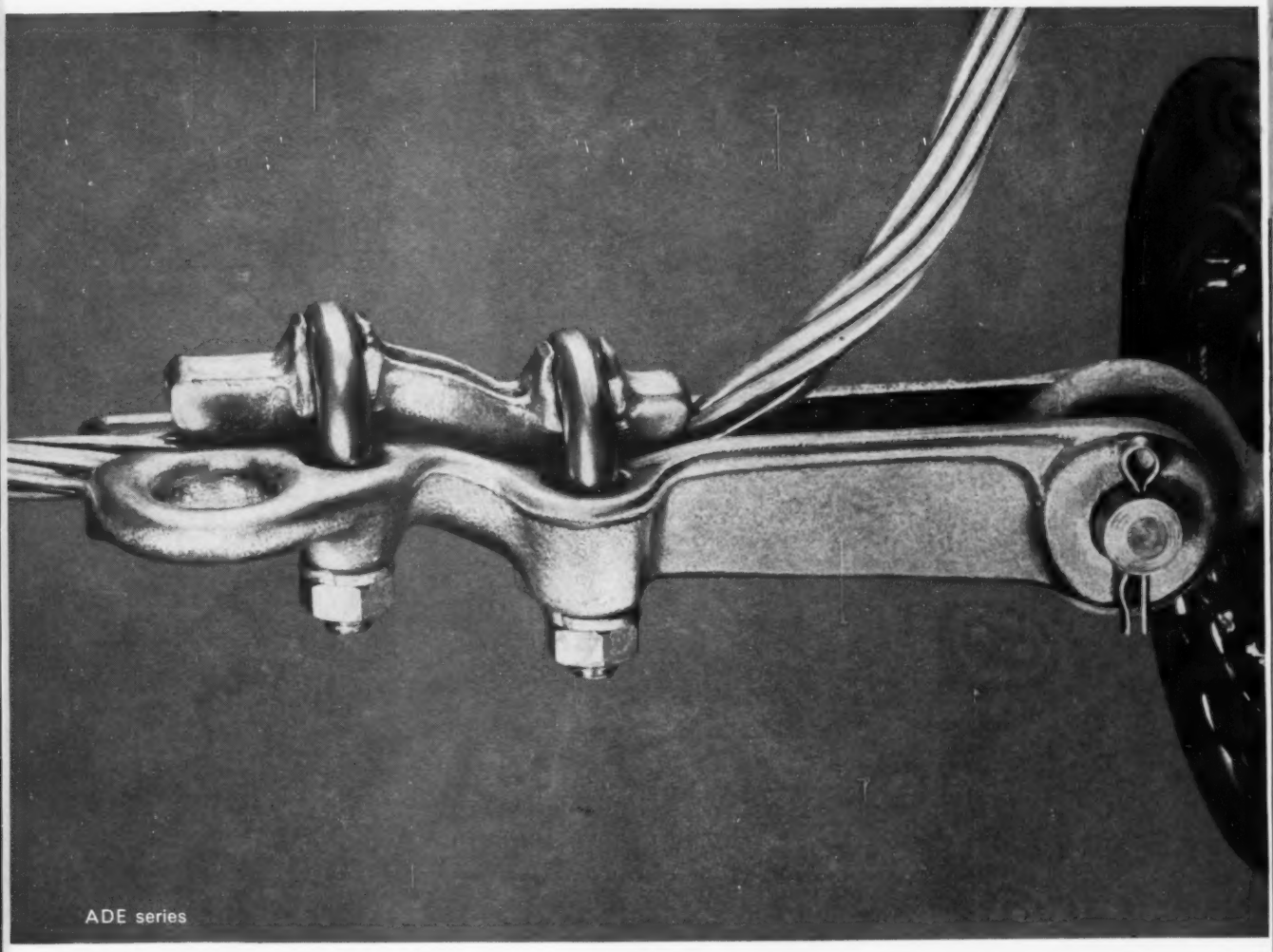
► **Hotpoint Appliance Sales Co.** has announced establishment of a San Diego branch with Jerry Winner as sales manager. Hotpoint appliances were formerly distributed in San Diego and Imperial Counties through the General Electric Supply Co. branch at San Diego. Winner was formerly sales manager for Hasco in Seattle and Fresno. He said the new setup here will give dealers a closer link with the factory.

► **Mountain Appliance Distributors Inc.** of Denver used the services of 15 disc jockeys on five radio stations for a month-long promotion during December of the Philco-Bendix Duomatic combination washer-dryer. The jockeys plugged the appliance with spot announcements on Monday — traditional wash day— throughout the month. Before the promotion they were all briefed at Mountain Appliances's salesrooms by John J. Perry, sales manager.



How to increase profits from kitchen sales was discussed at San Diego Bureau of Home Appliances' five-session course in kitchen modernization. Instructors in this course for industry sales people were, left to right; Oliver Schutte, chairman of the kitchen modernization committee; Bruce Ellis, G-E Appliance Co., Los Angeles; Carleton Barker, San Diego G&E; Norman Anderson, chairman of the sales training committee; Bill Durning, committee member; and Jim Hardin, San Diego G&E

grip...



ADE series

ANDERSON ELECTRIC

Anderson's exclusive Snub-Seat straight line clamp has higher holding power than comparable clamps. Built for trouble-free service, its unique "working" features facilitate hot line work, distribute pressure preventing cable damage.

ANDERSON ELECTRIC CORPORATION
Birmingham 1, Alabama

Export Representative: International Standard Electric Corp.

Aluminum & Bronze Power Connectors • Clamps • Fittings • Accessories for SUBSTATION • TRANSMISSION • DISTRIBUTION

Represented on the West Coast by:

Industrial Engin. & Equip. Corp.
417 S. Hill Street
Los Angeles 13, California
Telephone: MIchigan 7794

Waltham, DeWitt & Krusi
1048 Monadnock Building
San Francisco 5, California
Telephone: GArfield 1-5054

Hamilton Associates
1236 Elati Street
Denver 4, Colorado
Telephone: CHerry 4-1505

Clarence W. Silver Company
550 West Seventh South Street
Salt Lake City 4, Utah
Telephone: ELgin 5-5378

Muth-Richards Company
1804 Bush Place
Seattle 44, Washington
Telephone: CApitol 2128

Manufacturers—Distributors

California Firm Expands

Day-Brite Lighting Inc. of California has purchased a 15-acre site in Sunnyvale, Calif., for construction of a manufacturing plant and has an option on 15 acres adjoining.

Heretofore the company has done only assembly work in California with its parent company, Day-Brite Lighting Inc., manufacturing the line of commercial and industrial fluorescent fixtures.

The California subsidiary's assembly plant in Santa Clara, Calif., serves the Western states, Alaska and Hawaii, and foreign markets.

Rumors that the California firm is contemplating several mergers were reinforced by Day-Brite of California's announcement that size of the proposed plant cannot be determined yet because "expansion other than normal growth" is being considered.

The plant will cost at least $1,000,000 and it will be under construction by the end of 1958, at the latest.

► Output has been increased at **Fluorescent Fixtures of California's** South San Francisco plant by installation of a new hydraulic press brake. The new machine produces 300 baffle louver bodies per hour, more than twice the combined output of two conventional punch presses formerly used.

► **Westinghouse Electric Corp.** has opened a new apparatus office to serve southern Los Angeles County, C. Spence Purnell, South Pacific district manager, reports. The new operation will be managed by Carl W. Waldow. It shares space with repair and manufacturing facilities in a plant recently completed at 18020 Santa Fe Ave., Compton.

New Plant for Appleton

Appleton Electric was expected to move into its $360,000 Los Angeles plant by Dec. 27.

The 73,000-sq-ft structure will have about 34,000 sq ft of warehouse area and will house what is believed to be the largest zinc plating machine west of the Mississippi. Stetson Electric Co. is the electrical contractor.

Eugene Cherry will be in charge of manufacturing and William A. Mundy will direct sales and warehouse operations.

► Representatives of the **Touch-Plate Mfg.** Corp. from the United States, Canada and Mexico City recently attended a three-day sales seminar at the factory in Long Beach. Highlight of their visit to southern California was a trip to the *People Are Funny* television show in Hollywood. Art Linkletter, star of the show, is also president and chairman of the board of the Touch-Plate Mfg. Corp. K. P. Cronk is general manager.

► **The U. S. Court of Appeals** for the Fourth Circuit in Richmond, Va., has denied a petition of Minnesota Mining & Mfg. Co. for a rehearing of its plastic tape patent infringement case against Plymouth Rubber Co. Inc. A motion to reopen the case was also denied.

► Employment is expected to reach 1,500 in the next three years at **Cannon Electric's** new $1,250,000 plant in Santa Ana. Cliff Anderson, general manager, reports the 106,000-sq-ft facility is designed for mass production and is one of the nine world-wide sources of Cannon plugs.

► **Sam Beck**, president of Central Electrical Supply Co. at Denver, has just celebrated 50 years in the electrical business.

► **Hoffman Radio Division** of Hoffman Electronics Corp. has appointed Merchandising Distributors Inc., San Diego, as distributor in San Diego and Imperial Counties. The territory was formerly covered by Hoffman Sales Division of San Diego, which was discontinued.

► **Clifton Precision Products** Inc. of Clifton Heights, Pa., has started production of miniature synchros at its newly opened branch plant at Colorado Springs.

► **Swimming pools for cadets** at the Air Force Academy under construction at Colorado Springs are going to be brightly lighted. E. J. Reinhardt, district manager for Crouse-Hinds Co., reports delivery to the academy of 115 underwater floodlights. The 16-in. (diameter) lights range from 500 to 1,500 w capacity.

► Among those attending the first sales meeting ever held by **Thompson Electric Co.** of Cleveland was Glenn B. Gaer of Denver, representative for the manufacturer of disconnecting and lowering hangers and Servisafe poles.

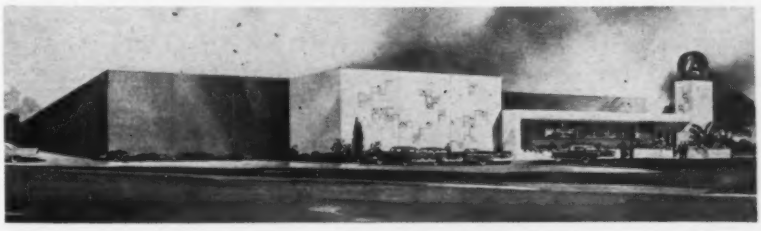
► **Allied Electric Motor Service,** 3805 Ventura, Fresno, has been appointed a certified service shop for Allis-Chalmers motors and transformers in Fresno and Tulare Counties in California. John Nesper and Sal Rome are co-owners of Allied Motor Service.

► **Federal Pacific Electric Co.** will acquire all outstanding common stock of the Roller-Smith Corp., Bethlehem, Pa., in exchange for 25,000 shares of its own common stock, according to an announcement by T. M. Cole, Federal Pacific executive vice-president. Roller-Smith will be managed as a wholly owned subsidiary.

► Robert Dummell and John McCulloch, **Holophane's** Bay area representatives, have moved to 115 New Montgomery St., San Francisco.

► **Westinghouse Electric Supply's** new distribution center at Ogden was opened last month to supplement the Pacific Coast center at Clearfield Naval Supply Depot. The 5,000-sq-ft building at 2660 Lincoln Ave. was built for distribution to contractors and small appliance dealers in the area.

► **G-E's wire and cable manufacturing** facilities at Oakland will be expanded early next year, Beekman F. Ilsley reports. The department will take the space formerly used by the Industry Control department, which will be moved to San Leandro, Calif.



This is the architect's drawing of the new Appleton Electric warehouse-factory

Front section and parking lot, above, warehouse, center, and retail showroom

HEPCO Opens New Building

Facilities for display, demonstration and sales processing of products for dealers, contractors and general public are provided in the new $1,500,000 building opened by Honolulu Electrical Products Co., Hawaiian Electric subsidiary. Comprised of several warehouse units, the building covers 2¾ acres of a five-acre site near Kapiolana Blvd.

General display area is divided into retail and contractors' sections with separate entrances off the 250-car parking area. These areas are flexible to take care of variations in sizes and types of products.

The entire building serves as a showroom of commercial lighting fixtures for various applications. Its glass front, which can be used as one big display area or divided by partitions, makes an effective show window by day or night.

Glass-enclosed booths are used for demonstration of appliances, radio and TV, with household lighting fixtures serving as a divider between retail and contractors' sections.

An auditorium adjoining the appliance area has a three-section stage on a track to facilitate loading heavy equipment.

In addition to offices, warehouse and display space, the building houses service shops equipped to handle maintenance and repair of all types of electrical goods.

► **General Electric's** Assemblies & Components sales department has moved to the Sales Mart, 1485 Bayshore Blvd., San Francisco 24. It formerly was at 555 Minna St.

NOW...Sangamo Presents...

A NEW TWO-STATOR FOUR-WIRE DELTA METER

for new advantages in 240v measurement

GREATER RANGE OF APPLICATION—Extended range, in both directions, lets the Sangamo P2SΔ Meter start at ¼% of rated load—yet operate continuously at 666⅔% of rating with only 50°C maximum temperature rise. You can use this meter for small loads and large ones.

EASIER ADJUSTMENT AND MAINTENANCE—All adjustments are easy to reach and make—direction of effect is indicated—backlash is eliminated. Low friction register is simple in design, provides automatic mesh adjustment. Potential coil can be easily replaced without any disassembly of other components.

HIGHER INSULATION LEVEL—The individual windings of the current coil are encapsulated in chlorinated polyether insulation of high dielectric strength. Voltage breakdown is in excess of 10,000 volts RMS—the equivalent of a 15 KV surge.

SAVINGS IN HEIGHT AND COVER REPLACEMENT
The Sangamo P2SΔ Meter has been substantially reduced in height. The cover is the same as that used on all singlephase metal base socket meters manufactured since 1936.

PROVEN ECONOMY THROUGH SLOW SPEED
Sangamo *slow speed*—proved so well on the singlephase J2 Sangamo Meter—gives even greater benefits in two-stator meters. Reduced series damping and fewer revolutions just naturally mean greater accuracy and better performance.

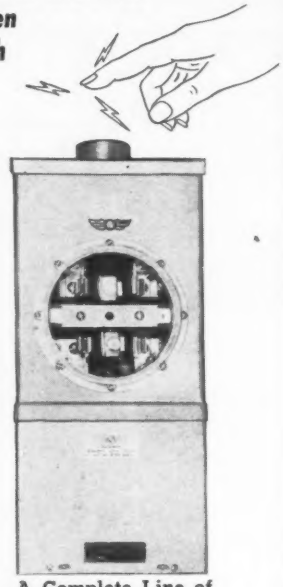
THE COMPLETE LINE OF LIFETIME GUARANTEED SANGAMO TYPE P METERS WILL HANDLE ALL POLYPHASE MEASUREMENT

SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

JH57-9

The Line With The Golden Touch



A Complete Line of Heavy Duty Sockets

BLAKEMAN ELECTRIC BB BROTHERS MFG. CO. INC.

5859 Compton Ave. Los Angeles 1, Calif.
LUdlow 1-8231
CONTACT YOUR JOBBER
METER MOUNTING DEVICES • THAT'S ALL

FOR SALE

175 Transformers
1.5 to 1000 KVA
Current listings sent upon request.

GENERAL METALS of the Aleutians, Inc.

1919 Canal Street • Tacoma 2, Wash.
Telephone FUlton 3-3443

ADVERTISING AND SALES PROMOTION CONSULTANT

Ebasco offers career opportunity as a utility consultant in advertising, sales promotion and public relations. Must have experience in utility sales, ability to work on management level, plan and write programs, analyze problems and write reports. Write full details including salary requirements.

EBASCO SERVICES INCORPORATED
Sales and Public Relations Dept.
Two Rector Street New York 6, N. Y.

LOOK IT UP FIRST

in Electrical West's

BUYER'S GUIDE AND DIRECTORY

1958 Edition sent to all subscribers in November. Extra copies available $1.00 each. Write to Circulation Mgr., Electrical West, 68 Post St., San Francisco 4, Calif.

Political Fronts

Atomic Pot Bubbling

When Congress reconvenes after the first of the year, atomic fireworks can be expected. It will be a part of the congressional program to try and re-establish U. S. prestige in the fields of atomics and missiles.

Recent comments indicate senators and congressmen are restless; that there will be many advocates of a more positive atomic program sponsored in part by more government funds. Representative Carl Durham, chairman of the Joint Atomic Energy Committee, has proposed a 10-year program of government financial assistance to industry for civilian atomic power development.

It has been pretty well admitted that sheer economics has put the brakes on the atomic energy program. The problem of how to accelerate nuclear developments is one that will cause considerable oratory and probably will end up, according to comments of many of those close to the controversy, with considerably more federal funds being funneled into the pot. Whether or not this means resurrection of a Gore Bill type of operation, wherein the federal government would build large-scale atomic stations, remains to be seen.

Dam Hassle

Wayne Morse, Oregon senator, stated that he and other congressmen intend to introduce a bill in January to suspend the licensing authority of the Federal Power Commission in the middle Snake region. This action indicates the tenor of recent hearings by the Corps of Engineers on proposed dam sites on the Snake and upper Columbia River.

It was the backers of Nez Perce (federal construction) vs sponsors of the Pleasant Valley-Mountain Sheep projects (private financing) and proponents of the mammoth Paradise Dam (federal) vs the supporters of the Buffalo Rapids project. Federal power advocates also attacked Idaho Power Co.'s projects at Ox Bow and Hells Canyon, already licensed by FPC.

The 1,500,000-kw Nez Perce project below the confluence of the Snake and Salmon Rivers was opposed by fish and wild life interests as well as the Pacific Northwest Power Co. which is seeking license for the Pleasant Valley-Mountain

Sheep projects on the lower Snake River. The latter project would develop 1,183,000 kw at a cost of $234,000,000.

Paradise Dam on the Clark Fork in Montana would have an ultimate capacity of over 1,000,000 kw and would store 4,000,000 acre-ft of water. Of its estimated cost of $450,000,000, $200,000,000 would be needed for relocation costs. The Northern Pacific Railroad alone would have to rebuild 69 miles of its main line through mountainous country that is subject to slides and rock falls. The alternative to the Paradise project is the Buffalo Rapids Dam which the Montana Power Co. is prepared to build at a cost of over $80,000,000.

Testimony given at the hearings will be used by the Corps of Engineers in a review of its 1948 Columbia Basin 308 report.

Water Hassle

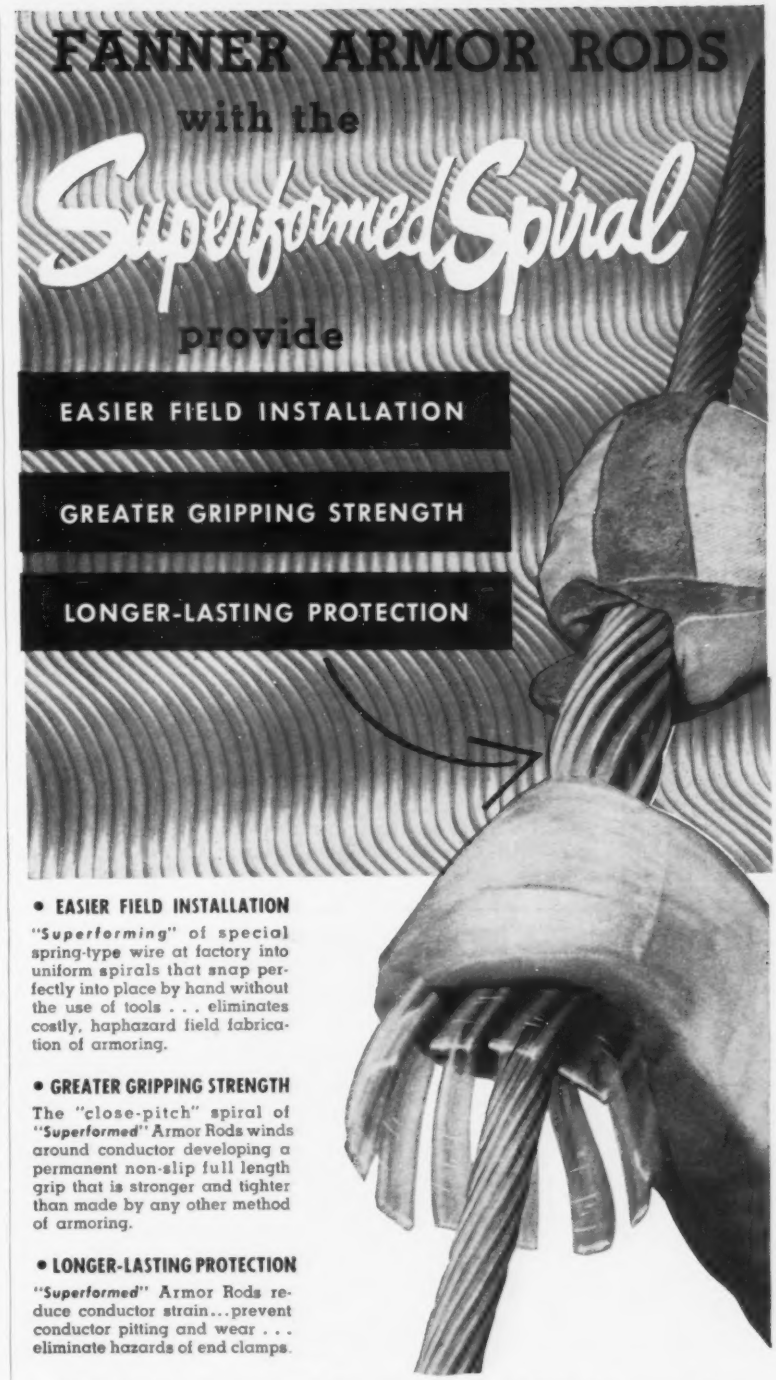
The Colorado River lower basin states of California, Arizona and Nevada are preparing to carry their fight over water storage at Glen Canyon Dam direct to Congress.

Legislation proposed as a result of a conference between Gov. Goodwin J. Knight of California, Gov. Ernest MacFarland of Arizona and Gov. Charles Russell of Nevada would be in the form of a rider to the Glen Canyon appropriation bill and would be designed to protect the rights of lower basin users. The latter claims that the present federal government plan (impounding all surplus water at Glen Canyon) would imperil the water and power supplies of the lower basin at Hoover.

The lower basin states want cheap, surplus power through Hoover Dam, as well as all the downstream water and power commitments. To do this, the lower basin states would even drain off the waters of the Glen Canyon Dam reservoir to assure a constant flow through Hoover.

The conference was an attempt to work out a system to fill the 28,000,000-acre-ft reservoir behind the Glen Canyon Dam near the Arizona-Utah state line with Colorado River water without disrupting water and power commitments to downstream users.

The lower basin states want half of all excess waters released into Lake Mead to provide cheap surplus power, a proposal which the government has rejected.



• **EASIER FIELD INSTALLATION**

"*Superforming*" of special spring-type wire at factory into uniform spirals that snap perfectly into place by hand without the use of tools . . . eliminates costly, haphazard field fabrication of armoring.

• **GREATER GRIPPING STRENGTH**

The "close-pitch" spiral of "*Superformed*" Armor Rods winds around conductor developing a permanent non-slip full length grip that is stronger and tighter than made by any other method of armoring.

• **LONGER-LASTING PROTECTION**

"*Superformed*" Armor Rods reduce conductor strain...prevent conductor pitting and wear . . . eliminate hazards of end clamps.

To get the best — specify Fanner "*Superformed*" Armor Rods. Get acquainted with the important savings they offer by writing for descriptive literature today.

CENTER-MARKED, COLOR CODED AND PACKED IN CONVENIENT CARTONS

Licensed for use under patent Nos. 2,275,019 and 2,587,521

Fine Fanner Superformed Products

THE FANNER MANUFACTURING COMPANY

Electrical Products Division

BROOKSIDE PARK • *Established 1894* • CLEVELAND 9, OHIO

Telephone: SHadyside 1-6000

AGENTS and DISTRIBUTORS IN PRINCIPAL CITIES

ARMOR RODS · LINEGUARDS · TAP ARMOR · PATCH RODS · FANNGRIPS
PLASTIC FANNGUARDS · PLASTIC INSULATING TUBINGS AND MOLDINGS

Public Power

Changing Methods

Seattle City Light has started making extensive changes in its organization and operation, as a result of a survey conducted by Booz, Allen & Hamilton, a management consulting firm.

An administrative survey committee, receiving the report from the consultants, has made 20 specific recommendations in regard to changes. Paul J. Raver, City Light superintendent, reported that nine of the 20 are now either in force or in the process of being adopted.

Among the nine recommendations accepted is a reorganization of the engineering division. In the future, there will be a contract-construction section, a combination of all civil and structural engineering work in a project engineering division, and a third division with all electrical work in the electrical engineering division.

Seven of the recommendations require additional study, according to Raver, and four were "contrary to policies . . . established in the Lighting Department as sound business practice," he said.

The committee recommended discontinuing six branch offices, centralized control of commercial consultants from seven districts to the central office, discontinuing a subsidy on range and water heater installations, and imposition of a service charge for range and water heater repairs.

At this point, Raver has made no comment on six recommendations aimed toward consolidation of the Light and Water Departments, except that they required "a great deal of further study."

Court Review Granted

The city of Tacoma has been granted a U. S. Supreme Court review of a decision blocking construction of two dams on the Cowlitz River after they were licensed by the Federal Power Commission.

The controversial decision that is being appealed was given by the Washington State Supreme Court in a suit filed by the state and the State Department of Fisheries & Game. Opposition developed because one of the dams would inundate a state-owned fish hatchery.

In its appeal to the Supreme Court, Tacoma said the state refused to sell the hatchery or accept a replacement, and denied the city's right to condemn it under the Federal Power Act.

SACRAMENTO RESTAURANT PEOPLE got the electric story—and a ride to the recent Western States Restaurant Convention and Exposition in San Francisco—when Sacramento Municipal Utility District chartered two 45-passenger buses for the round trip. Working with local restaurant equipment dealers, Ted Paulos, SMUD commercial cooking specialist, was able to send 70 restaurant owners, architects and school-lunch program authorities plus the utility's sales force and service personnel. The buses were decorated, inside and out, with large banners carrying the electric cooking message. Instead of the usual bus cards inside, the utility put up 8x10 photos of all-electric installations. Two SMUD sales representatives were in charge of each bus and told the electric story en route. Refreshments were served each way and a prize drawing helped entertain the group. Marlen N. Davis, supervisor of commercial-industrial sales development for the utility, reports everybody was pleased

Against Preference

Members of the Oregon Farm Bureau Federation have recommended to the American Farm Bureau Federation that the "power preference" in the AFBF resolutions be discontinued.

"The long-standing provision in federal power legislation setting up special preference for the delivery of federally produced power to public power bodies has worked to the disadvantage of Oregon, where 84% of the power service customers are served by private companies," the resolution states. However, the Oregon Farm Bureau recommends that preference continue in relation to REA projects.

Also in the recommendations are:

"We propose a Pacific Northwest interstate compact that shall set up a regional development agency entrusted with the necessary powers to accomplish its mission of orderly development.

"We are opposed to federal domination of power, and its resultant domination of industry. Hence, we oppose any federal river authority or federal development corporation."

► Imperial Irrigation District has put on its line a new 44,000-kw generating unit, installed in the district's steam-electric plant at El Centro. The new unit has been under construction since mid-February.

► The Town Board of Farmington, N. M., has voted to take over operation of its municipal power system. Basin Light & Power Co. has operated the system, which has served Farmington, Aztec and other nearby communities since 1945.

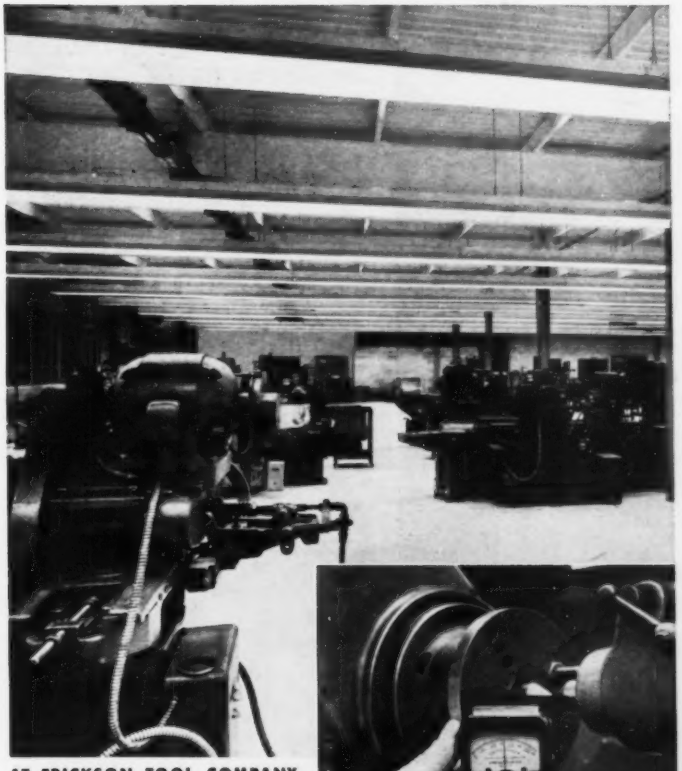
REA Loans

Roosevelt County Electric Cooperative, Portales, N. M., has secured a $100,000 REA loan to help rural consumers on the borrower's system finance the wiring of their premises and install electrical appliances.

Harney Electric Cooperative Inc., Burns, Ore., has secured a $50,000 REA loan to help about 200 rural consumers on the system to install electrical equipment and appliances for their farms. A second loan of $87,000 was made to the cooperative to finance construction of 48 miles of distribution line to serve 18 new customers.

The Powerful Power-Groove!

Radical new General Electric fluorescent lamp design can give your customers higher, more economical light levels



AT ERICKSON TOOL COMPANY (above), 450 G-E Power-Grooves, eight feet long, mounted 10 feet high, with 10 feet between rows, maintain a lighting level of 160 footcandles economically. This means there is plenty of light right at the machines (see footcandle reading at right)—where extra light means extra safety, extra accuracy for workers. No supplementary lighting is needed. Powerful Power-Grooves do it all!

While plans for their new building were still in the early stages, officers from Erickson Tool Company of Cleveland, Ohio, visited the Lighting Institute—General Electric's lamp headquarters at Nela Park. There they saw the whole array of lighting methods and discussed the powerful new G-E Power-Groove Lamps.

They were shown how these revolutionary lamps provide outstanding general lighting, making it unnecessary to use supplemental lighting on individual machines (like that used by Erickson toolmakers in their old plant). They saw how powerful Power-Grooves would fill a plant with pleasant light that's easy on the eyes . . . as well as the pocketbook. The decision was made: Erickson's new plant would have G-E Power-Groove Lamps throughout!

Because G-E Power-Groove Lamps give nearly twice as much light per tube as High-Outputs—2½ times as much as 8-foot slimlines—your customers can get more light per fixture—with fewer parts to maintain. And compared to other fluorescent systems, they can save 5-20% on their initial investment.

Get the whole exciting Power-Groove story. Write General Electric Co., Large Lamp Dept., E W-18, Nela Park, Cleveland 12, Ohio. Better still, visit Nela Park and let us show you on-the-spot demonstrations of how the powerful Power-Grooves can work for your customers.

WORLD'S BRIGHTEST WORKSHOP—Now you can see powerful Power-Grooves in action . . . lighting the world's brightest workshop. It's at the G-E Lighting Institute at Nela Park. Plan to visit it and see for yourself.

Progress Is Our Most Important Product

GENERAL ELECTRIC

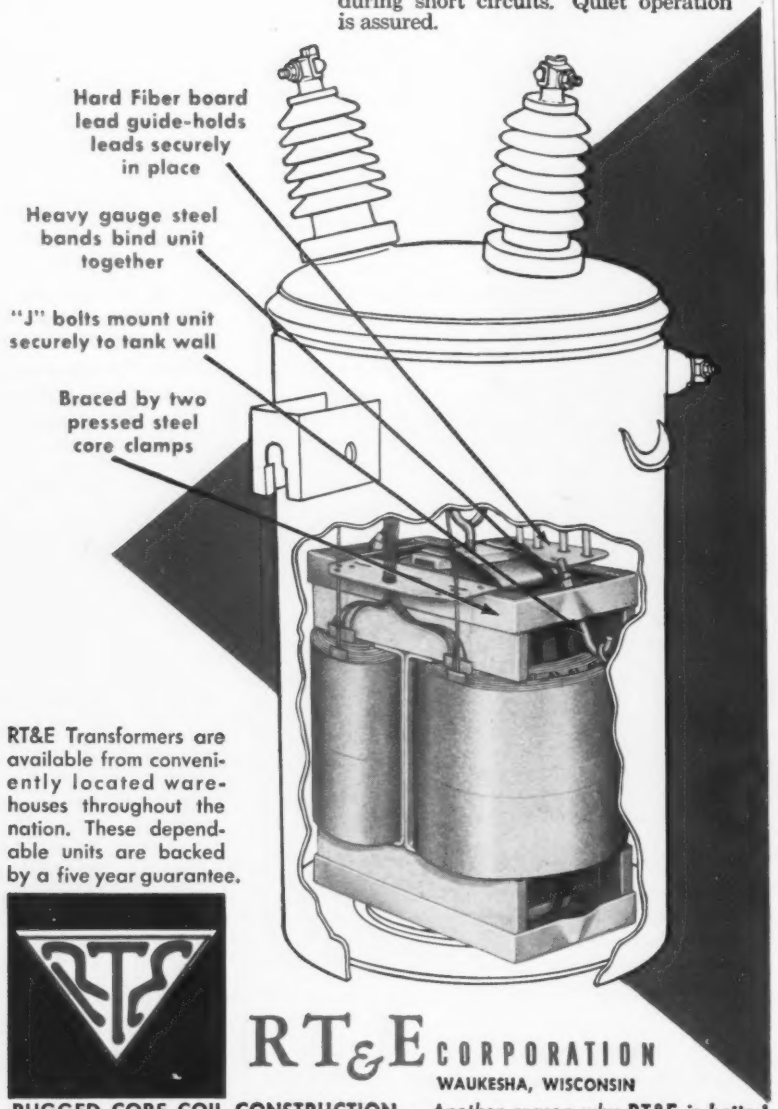
What Makes RT&E Transformers Better?

RUGGED CORE-COIL CONSTRUCTION

Insures longer, more reliable transformer life.

Maximum mechanical strength of Core-Coil unit is obtained by RT&E's unique core-coil clamping method. This eliminates the conventional vertical clamp members by utilizing the tank for this purpose.

A rigid, unitized construction is thereby attained. This maintains all parts firmly fixed with relation to each other—additional coil surface is exposed to the cooling oil, and additional strength is gained for bracing the coil against distortion during short circuits. Quiet operation is assured.


Hard Fiber board lead guide-holds leads securely in place
Heavy gauge steel bands bind unit together
"J" bolts mount unit securely to tank wall
Braced by two pressed steel core clamps

RT&E Transformers are available from conveniently located warehouses throughout the nation. These dependable units are backed by a five year guarantee.

RT&E CORPORATION
WAUKESHA, WISCONSIN

RUGGED CORE-COIL CONSTRUCTION — *Another reason why* **RT&E** *is better!*

► **Howard E. Bayley** of Industrial Electric Co., Seattle, succeeds Oscar Olson, Salmon Bay Electric, as president of the growing Puget Sound Chapter, National Electrical Contractors Assn., Maynard Sundt, secretary-manager announces. The chapter, which recently established a new Cascade division in Everett with 12 members and added seven new members to the Seattle division since March, had its annual election last month.

Others elected were: John Sroufe, Northwest Electric, Seattle, vice-president; Charles F. Meagher, Mars Electric Co., Seattle, treasurer; Harold Patchett, Industrial Electric, Everett, vice-president and chairman of Cascade division; Ken Hills, Pacific Electric, Bremerton, vice-president, chairman Bremerton division; board members—Donald W. Close, Seattle; Lloyd Larsen, Seattle; Irving Chapman, Renton; Frank Holert, Seattle; and Oscar Olson, Seattle. Sam Ewing was elected vice-chairman of the Cascade division.

► **From Santa Barbara to Palo Alto** is now the area represented by the Santa Clara-San Benito Chapter of NECA with headquarters in San Jose, according to George Harter, chapter manager. By this enlargement of territory, the San Jose-based chapter takes over the management and bargaining for the former Central Coast Chapter that headquartered in Santa Barbara. The new lineup includes San Luis Obispo and Santa Maria, Salinas and King City, but does not include Monterey or Watsonville and Santa Cruz (as was erroneously reported in a recent News Letter). The chapter name may be changed to describe its new area and Harter expects it will have a field representative to assist him in chapter affairs.

Officers elected at the annual meeting in December added James Mertz to the directors to represent Salinas area and Jack Winstrom to represent the Central Coast division. President Paul Leslie, All-Cal Electric Co., San Jose, was re-elected as were Kelvin Young, McKinley-Young Electric Co., Campbell, vice-president; James Sardella, S & S Electric, San Jose, governor and Irving

With the Contractors

Butcher, Roy M. Butcher Electric, secretary-treasurer. Richard Wilkinson of Saratoga was added to the board of directors.

Although Ventura, once a part of the Central Coast Chapter, is not included in the new alignment, benefit pension payments for it will be collected by the San Jose office.

► **The three semiautonomous branches** of Northern California Chapter, NECA, held annual elections last month. For the Alameda County branch Ed. F. Hutka, Livermore, was elected chairman; Art Sousa, Broadmoor Electric Co., San Leandro, vice-chairman; and on the board George Curran, past chairman, R. W. Beard, Leon Hampton, Henry Hertlein, Steve Lindheim, Charles Turner, S. C. Gates.

The Contra Costa County branch named Chet Brunnelle, Concord Electric, as chairman and Jack Vance, Pioneer-California Electric, Richmond, vice-chairman. Directors elected were Andy Maser, Thompson Electric Co.; Willard McKibbon, Fischbach & Moore; Robert Ingerson, Newbery Electric Corp.

Napa-Solano County branch reelected Hal Pierce as chairman, Don Pearce of Stanley Pearce Electric as vice-chairman; Jack Ellis as director, all of Vallejo; and Robert Covey of Fairfield as alternate. Chapter officers will not be elected until the board of directors meets Jan. 20, according to Ernest Kramm, manager.

► Flooding of the power house work area on Portland General Electric's $24,000,000 North Fork-Faraday project on the Clackamas River has set that phase of the PGE Clackamas River project back three weeks, according to Larry J. Kelsh, PGE resident engineer.

The downpour which caused the flooding resulted from rainfall measured at 2.71 in. in a 24-hour period from 8 a.m. Nov. 12 at PGE's Oak Grove project 20 miles upstream. The water poured through penstock openings on which construction crews had not yet completed installation of closure gates.

Concrete placement for the 53,000-kw North Fork Dam is now 72% complete. Guy F. Atkinson Co. holds the general contract.

BROWNLEE DAM is shown in the homestretch of construction. Vertical lines (right) outline dam's spillway section. The dam's 395-ft height, indicated by horizontal line, will make Brownlee the world's second highest structure of its type. Below the embankment at left center is the excavation for Brownlee's power house

EXAMINE any of these McGRAW-HILL BOOKS for 10 Days FREE

ELECTRICAL CONSTRUCTION COST MANUAL

JUST OUT! Helps you save time and trouble in estimating electrical construction costs and develop more realistic profitable bids. Develops standard assemblies as a nucleus, for unit costing of materials and labor, covers job factors, overhead, and profit; shows how to bring these factors together in an integrated cost system and estimate. **By Ralph E. Johnson, Pres., Sturgeon Elect. Co. 427 pp., 226 illus., $10.00**

ELECTRICAL SYSTEMS DESIGN

Brings you a complete picture of all that is best in modern practice in the design and layout of electrical systems for power, light, heat, signal systems, and communications. Shows how to select apparatus of the right type, size, appearance, or rating; how to work with the architect; how to design lighting systems scientifically, etc. **By J. F. McPartland and Editors of Elect. Const. and Maint. 140 pp., illus., $6.00**

WIRING MANUAL FOR HOME AND FARM

JUST OUT! A practical manual to help you plan wiring systems that will effectively meet today's growing electrical needs in home and farm. Methods for determining loads, service entrance feeder size, number and size of branch circuits, number and type of outlets, etc.—step-by-step procedures—these and other practical helps are all part of this handy guide. **By A. Carl Bredahl, Westinghouse Elec. Corp. 221 pp., 135 illus. and tables, $4.95**

STANDARD HANDBOOK for ELECTRICAL ENGINEERS

Gives you thousands of facts and figures, systems and measurements, methods and materials in every major area. Covers everything from fundamentals to such things as electric circuits, equipment, prime movers, nuclear power, and transistors. Prepared by a staff of specialists. **A. Knowlton, Electrical World, Editor-in-Chief; R. M. Shoop, Electrical World, Assistant Editor. 9th Ed., 2230 pp., over 1900 illus., $19.50**

MAIL THIS COUPON

McGraw-Hill Book Co., Dept. EW-1
327 West 41st St., New York 36, N. Y.

Send me book(s) checked below for 10 days' examination on approval. In 10 days I will remit for book(s) I keep, plus few cents for delivery costs, and return unwanted book(s) postpaid. (We pay delivery costs if you remit with this coupon—same return privilege.)

- ☐ Johnson—**Elect. Const. Cost Manual, $10.00**
- ☐ McPartland—**Elect. Systems Design, $6.00**
- ☐ Bredahl—**Wiring Man. for Home & Farm, $4.95**
- ☐ Knowlton—**Stand. Hdbk for Elect. Engrs., $19.50**

(Print)
Name .....
Address .....
City ..... Zone ..... State .....
Company .....
Position .....
For price and terms outside U.S. write McGraw-Hill Int'l., N.Y.C. EW-1

People

► **Roy Kimberlin,** who started as sales record clerk in 1922 for Western Electric Co. in San Francisco, retired Jan. 1 from Graybar Electric as central Pacific district manager and will be succeeded by **G. L. "Bill" Call,** formerly of Portland and Seattle and more recently district sales manager of Graybar at Cincinnati. Kimberlin advanced in San Francisco and in 1936 was sent to Salt Lake City as branch manager, then 1944 to St. Louis as Mississippi district manager, returning to San Francisco in 1951. He was elected a director and a voting trustee in 1956. Call started in Dayton in 1928, worked in Portland from 1929 to 1935, Seattle until 1942, served in the war and returned in 1946. He was made branch manager in Akron in 1953 and Cincinnati district manager two years later.

► **John Carder Jr.** has joined the Sierra Electric Corp. as sales representative in the states of New Mexico, Arizona, Colorado, Utah and Wyoming. Carder maintains complete warehouse facilities in Albuquerque and will be responsible for the entire Sierra line of wall plates and wiring devices.

► **Winn Tuttle** has been named manager of the Puget Sound Power & Light Co. office at Langlie, Wash. He succeeds **Fred Rinehart,** who retired in December after 40 years with the company. Tuttle was formerly farm consultant for the Northern division of the company.

► **Leslie Krajcsovics** has joined the electrical engineering department of Cornell, Howland, Hayes & Merrifield, Consulting Engineers at Corvallis, Ore. He was formerly on the staff of the Electrical Energy Control Board of British Columbia.

► **Larry Hittle** has been named electrical engineer for the Lewis County PUD at Chehalis, Wash. He is the son of Glenn Hittle, manager of the Cowlitz County PUD at nearby Kelso.

► **Mark D. Stenson** has been appointed assistant to **Owen Hurd,** managing director of the Washington Public Power System. Stenson was formerly an REA cooperative manager in Nebraska.

► **L. E. Long** was recently appointed manager of the San Francisco electrical sales branch of Wagner Electric Corp. He has been with the Wagner organization since 1934, and moves to San Francisco from the company's Los Angeles branch. His successor as sales engineer in Los Angeles will be **John Oakes,** who moves to California from St. Louis.

► **Carl Kempf** is now general manager of a Thomas & Betts factory in Elizabeth, N. J. **Howard Johnson** replaces him as district manager of the Los Angeles division. Don Freer moves from Los Angeles to become district manager in San Francisco, and **Bob Chadwick** transfers from Los Angeles to San Diego as district representative. **Leonard Johnson Jr.** is moving from San Francisco to the Los Angeles sales staff.

► **C. D. LaMoree** has been appointed secondary distributor for DuPont mylar polyester film, used in the manufacture of electrical motors and transformers. California and Arizona will be the territories covered.

► **Tom Buckwell** has joined the Electric Corp. in Los Angeles as sales engineer. Until 2½ years ago, he was branch manager for Westinghouse Electric Supply Co. in Fresno, and has been in the Wesco Los Angeles office since that time.

► **Dick Higgins** now has the position of advertising manager for Kelman Electric Mfg. Co. in Los Angeles. Higgins' successor as an application engineer is **Louis Stallkamp.** Another addition to the sales department is **Joseph Ferral,** who had been an application engineer with I-T-E Circuit Breaker Co. in Philadelphia.

► **Garth A. Duell** has joined Pacific Power & Light Co. as a geologist in its power project development department. Duell has done consulting work for the company during the past two years.

► **G. L. Bennis** has been appointed branch manager of the San Francisco office of Sola Electric Co. He moves to San Francisco from Los Angeles, where he was an assistant sales engineer.

► **Roy S. Samson** becomes superintendent of the Anchorage Municipal Light & Power Department upon the retirement of **William McKinley.** Samson has served in the electric utility industry in the Pacific Northwest and Alaska since 1933.

► **A. U. Zimmerman** has been transferred to the San Francisco office of California Pacific Utilities Co. to serve as assistant to E. E. Kime, vice-president in charge of operations. The job he takes over is newly created, and is made necessary by the growth of the company's operations. **Earl A. Hanson** will succeed Zimmerman as division manager at Susanville.

► **Kenneth W. Worrall** has been appointed Wyoming division office manager for Pacific Power & Light Co., with headquarters at Casper.

► **Thomas P. Jenkins** has been appointed to succeed **Dan F. Villa** as manager of Pacific Gas and Electric Co.'s Humboldt division. Villa retired Jan. 1, after working with PG and E since 1913. Jenkins moves up from a former position as gas superintendent in the company's East Bay division.

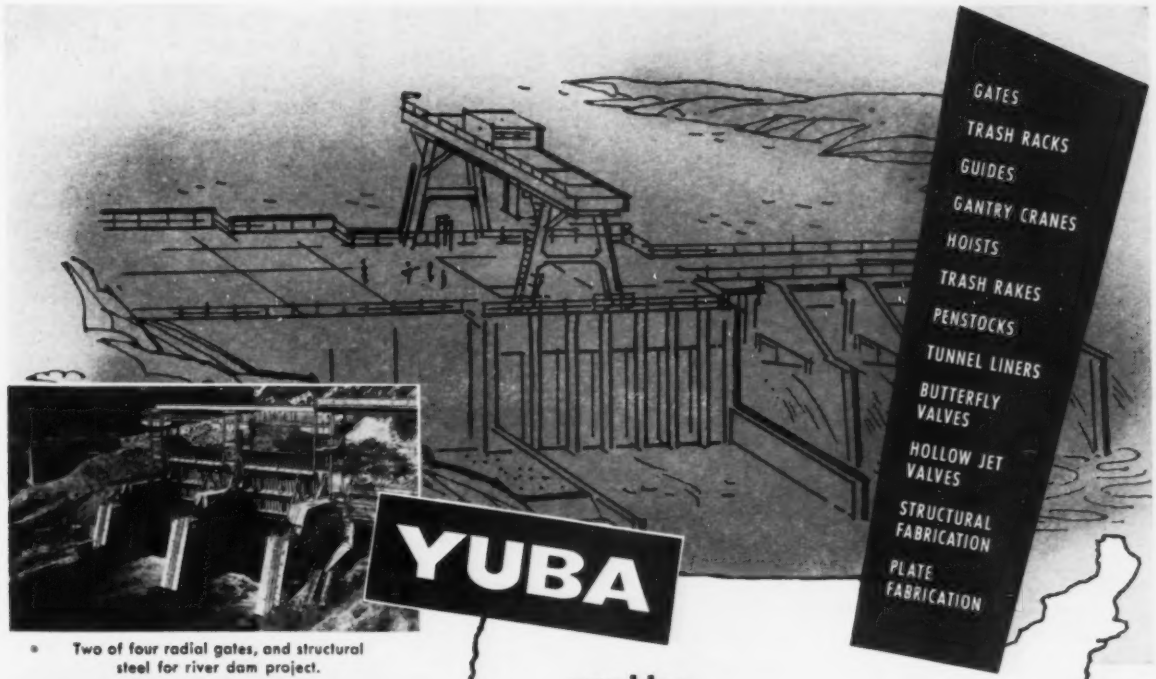
► **Dick Fennelly** succeeds **Ole G. Kirk** as superintendent of operations for Home Light & Power Co., Greeley, Colo. Kirk is retiring after 41 years with the company.

► **David F. Shaw** has been appointed a vice-president of the Kaiser Engineers Division of Henry J. Kaiser Co. in Oakland.

► **Thomas W. Hughes,** Sheridan division manager for Montana-Dakota Utilities Co., will be succeeded by **Richard L. Jacobson** when he retires March 31, 1958. Hughes has worked in the gas and electric business for 52 years, 42 of them in Sheridan.

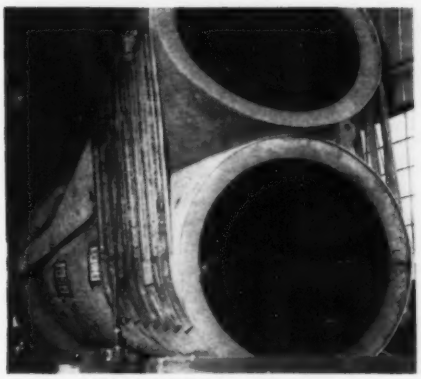
► **John Z. Lee** is new branch manager of Apparatus and Supplies for Westinghouse Electric Supply Co. at Fresno. He comes to Fresno from Cleveland, where he has been branch manager for the past eight years.

► **O. R. Doerr,** vice-president in charge of sales for Pacific Gas & Electric Co., has been named a trustee of the Illuminating Engineering Research Institute.



Two of four radial gates, and structural steel for river dam project.

Part of 3,000 ton trashrack shipment.



105" Wye for western powerhouse.

provides the engineered fabrication to harness hydroelectric power

As a major source of fabricated and machined components and assemblies – to any geographical location – Yuba offers through Calsteel, Yuba Manufacturing, and Adsco Divisions, a unique combination of experience, skills and facilities. Each has gained prominent recognition for products and services through many decades. Now integrated through Yuba Consolidated Industries, Inc., their combined know-how and facilities are available under a "package responsibility" – with the time-saving economy and convenience of working with a single organization as near as your telephone. Whatever your needs in harnessing the force behind hydroelectric power – you'll like doing business with Yuba. YE-801

YUBA CONSOLIDATED INDUSTRIES, INC.
San Francisco Sales Offices: 351 California Street
New York Sales Offices: 530 Fifth Avenue
SALES OFFICES AND REPRESENTATIVES IN PRINCIPAL CITIES

Divisions manufacturing hydroelectric equipment:

CALSTEEL DIVISION
Richmond, California

YUBA MANUFACTURING DIVISION
Benicia, California

ADSCO DIVISION
Buffalo, New York

► **W. A. Huckins,** manager of Utah Power & Light's business development department, was awarded an honorary membership in the Intermountain Electrical Assn. at its 1957 Christmas party. A founder of IEA, he was given this special award for his service to the league and influence for good in the industry.

► **Dave Crenshaw** has been named chief of the designing department of Ruby Lighting in Los Angeles.

► **Charles H. Zender** has been appointed advertising and sales promotion manager for McCollum-Law Corp. of Denver, which is the Westinghouse appliance distributor. Zender had been in the advertising art department of the Denver Post. He succeeds **Jack McCrea.**

► **Jim Wall** has been appointed sales manager for the Denver and Salt Lake City branches of W. E. Young Electric Co. of Denver. Wall has been a sales engineer for Young for the past 10 years.

► **Arizona Electric Club,** newly organized, elected Jerry D. Whitnell of Arizona Public Service Co., acting chairman, as its president for 1958. Serving with him are Jerry Brown, Graybar Electric, vice-president; Jerome Kelleher, Electric Joint Industry Board, secretary-treasurer; Earl Harper, Fishbach & Moore, sergeant-at-arms; and as directors F. T. Fahlen, Ernest Cannon, Paul Scruggs, Dave Walkington and R. Alexander. Like other electric clubs this one includes members from all branches and phases of the electrical industry to promote better relations among them. Meetings are held at noon on the second Wednesday of each month.

► **James G. Graham** has been named manager of the Fairbanks, Morse & Co. Los Angeles sales and service branch. He succeeds **Paul A. Suess,** who retired Jan. 1.

► **Jerry Atherton-Ely** is now representing Sunbeam Lighting Co. in the San Diego area.

► **Ed Peterson,** Los Angeles manufacturers' representative, has added Century Lighting to his lines.

► **James McNulty** and **John Courrier** have joined the sales staff of Anaconda Wire & Cable, Denver.

► **Joseph C. Givens** has been named Western regional sales manager of the Chico General Products Corp. in San Francisco. Sales offices in Los Angeles, San Francisco, Seattle, Portland, Denver and Dallas will come under the supervision of Givens in the new organization.

► **Bernard A. Artz** has been appointed district manager of the Fisher & Porter Los Angeles office. He was formerly district manager of the company's Knoxville office.

► **T. M. Pollard** of Spokane has been appointed distributor of grid unit heaters, blast heaters and radiators made by D. J. Murray Mfg. Co. His distributorship covers 18 counties in Washington, 7 in Idaho and 8 in Montana.

Deaths

► **A. Craig McMicken,** retired general sales manager for Portland General Electric Co., died recently in Portland. He started his PGE career in September 1902 as a delivery boy and assistant packer in the supply Department.

► **Harry L. Thomas,** 85, of Salt Lake City and president of Thomas Electric Co., died in December of complications from a fractured hip. He founded the company in 1901. At one time, he had served as superintendent of the Heat, Light & Power Co. at Park City, Utah.

► **Harry S. Dorman,** 67, assistant to Administrator William E. Pearl of the Bonneville Power Administration, died recently in Portland after a long illness. He had been with BPA since April 1956, after retirement as Oregon Director of Finance & Administration.

► **Gustave W. Forsberg,** 78, former president of the Utah Electrical League and retired owner of the Wasatch Electrical Co., died at his Salt Lake home in November. Mr. Forsberg had worked in the electrical contracting industry since 1903.

► **D. A. Smith** of Graham Reynolds Electric Co., Los Angeles, died suddenly in late November from a heart attack. He had served almost 42 years with the firm, working up from stock clerk to general manager. At one time, he was chairman of the Western division of the National Association of Electrical Distributors, and had been an active member of the Electric Club and the Purchasing Agents Assn. in Los Angeles.

Calendar of Meetings 1958

February

3- 7—**Western Market,** Western Merchandise Mart, San Francisco

9-15—**National Electrical Week**

11—**Intermountain Electrical Assn.,** annual meeting, Salt Lake City

14-15—**Seattle Electrical Show,** Civic Auditorium

15—**Snake River Valley Electrical Assn.,** Owyhee Hotel, Boise

March

6- 7—**Pacific Coast Electrical Assn.,** Business Development Section, Statler Hotel, Los Angeles

26-27—**Northwest Public Power Assn.,** Engineering and Operations Section, Clark County PUD Electric Center, Vancouver, Wash.

27-28—**PCEA,** Engineering & Operating Section, Sheraton Palace, San Francisco.

27-29—**Electrical Maintenance Engineers Assn.** of So. Calif., Industrial Electric Show and Conference, Shrine Convention Hall, Los Angeles

April

14-15—**Rocky Mountain Electrical League,** spring conference, Shirley-Savoy Hotel, Denver

16-18—**NWPPA** annual membership meeting, Ridpath Hotel, Spokane

23-24—**PCEA,** Administrative Services Section, Valley Ho Hotel, Scottsdale, Ariz.

23-25—**Northwest Electric Light & Power Assn.,** Engineering & Operating and Purchasing & Safety Sections and Purchasing Committee, Hotel Chinook, Yakima.

May

5- 7—**National Electrical Contractors Assn.,** combined Districts 6, 8 and 9 annual conference, Hotel Biltmore, Los Angeles.

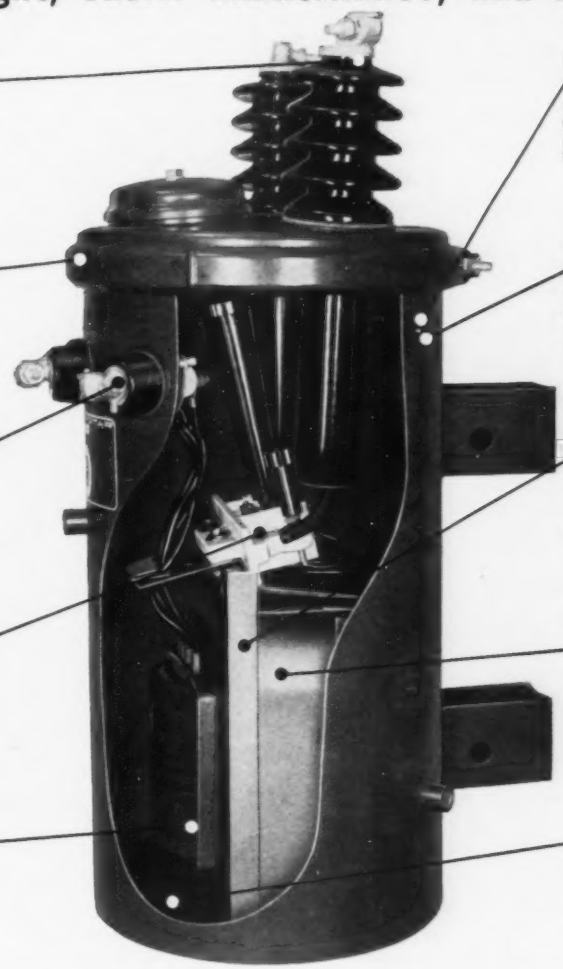
8- 9—**Illuminating Engineering Society,** Intermountain Regional conference, Hotel Whitman, Pueblo

12-13—**IES,** South Pacific Regional conference, Hotel El Cortez, San Diego

14-17—**PCEA,** annual convention, Hotel Del Coronado, Coronado

19-21—**NELPA,** Business Development Section & Advertising & Public Relations Committee, Rainbow Hotel, Great Falls

HERE'S HOW DELTA-STAR DISTRIBUTION TRANSFORMERS* offer lighter weight, easier maintenance, and improved core



BUSHINGS

Double-keyed—connector to porcelain—porcelain to tank. Assures positive lock against rotation.

COVER

Assures positive seal—and natural shedding of water. One-piece non-corrosive clamping band with re-usable nitrile rubber gasket.

TERMINALS

Tin-plated bronze alloy. Spring loaded to accommodate aluminum or copper conductors.

TAP CHANGER

Positively positioned. Liberal voltage-creepage distance. Handle grip above oil. Shorting bar under spring tension.

COIL

Wound with liberal insulation. Heavy Formvar wire. Ducts provide maximum, uniform cooling.

TANK

Design minimizes number of external parts. Pressure-tested for perfect sealing. Reinforced bottom edge.

FINISH

Provides maximum corrosion-protection. Special metal preparation prior to alkyd painting. All primer and finish coats baked.

CORE-COIL ASSEMBLY

Will not shift under severest handling conditions. Securely anchored to tank wall. Positively braced against short circuits.

PORTER CORE

Grain-oriented, cold-rolled silicon steel. Assures low losses, smaller tank, minimum weight.

INHIBITED OIL

Gives extended life with better insulating characteristics. Specially processed immediately before filling.

With single phase ratings from 3kva to 167kva, in standard voltages through 15,000 volts, this complete line of Delta-Star Transformers embodies the latest developments in transformer design . . . a pole type built to fully meet NEMA standards.

Send for 16-page illustrated catalog. **Write to H. K. Porter Company, Inc., Delta-Star Electric Division, 17th and Cambria Streets, Philadelphia 32, Pa.**

***PATENTS APPLIED FOR**

H. K. PORTER COMPANY, INC.

DELTA-STAR ELECTRIC DIVISION

Porter Divisions: Cleveland, Connors Steel, Delta-Star Electric, Henry Disston, Leschen Wire Rope, Quaker Rubber, Refractories, Riverside-Alloy Metal, Vulcan Crucible Steel, W-S Fittings, H. K. Porter Company (Canada) Ltd.

INDEX TO ADVERTISERS

January 1958

Accurate Mfg. Co. 22
Allen-Bradley Co. 107, 108
Allis-Chalmers Mfg. Co. 11, 63, 97
Aluminum Co. of America 48, 49
Anaconda Wire & Cable Co. 32
Anderson Electric Corp. 110

Blakeman Bros. 14, 102, 103, 114

Can Arm 103
Classified 114
Cornish Wire Co. 28

Delta-Star Electric Div., H. K. Porter Company, Inc. 123
Driver-Harris Co. 46

Electrical Industries Show 40
Electro-Motive Div., General Motors Corp. 42, 43

Fanner Mfg. Co. 115
Federal Pacific Electric Co. 58, 59
Fluor Corp. Ltd. 21

Gate City Steel 102
General Electric Co.:
Cleveland, Lamp Div. 117
Schenectady, Apparatus Div. 33, 34, 35, 36, 66
Glassheat, Inc. 103

Greenlee Tool Co. 10

Hill Transformer Co. 22
Honn Co., George E. 14

Indiana Steel & Wire Co. Inc. 28
I-T-E Circuit Breaker Co. 53, 54, 55, 56

Kamphausen Co., Dan 37
Kearney Corp., James R. 44, 45
Killark Electric Mfg. Co. 24

Hotpoint Co., Div. General Electric Co. 47

Lapp Insulator Co. Inc. 26
Line Material Industries 3

Meter Devices Co. 114
McGraw-Hill Book Co. 119
Moloney Electric Co. 38, 39

Okonite Co. 51

Pacific Coast Electrical Assn. ..... 4th Cover
Pacific Gas and Electric Co. ..... 3rd Cover
Pennsylvania Transformer Co. 30, 31
Plymouth Rubber Co. 15, 16, 17
Preformed Line Products Co. 4

R T & E Corp. 118
Rome Cable Corp. 7

S & C Electric Corp. 29
Sangamo Electric Co. 113
Simplex Wire & Cable Co. 23
Smoot-Holman Co. 1
Soapstone Duct Co. 52
Southern California Edison Co. ..... 2nd Cover
Southern States Equipment Corp. 41
Square D Co. 19
Sunbeam Lighting Co. 101

Thermador Elec'l Mfg. Co. Div. Norris-Thermador Corp. 25
Triangle Conduit & Cable Co. 12, 13

Victor Insulators Div. I-T-E Circuit Breaker Co. 50

Westinghouse Electric Corp. 8, 9, 85, 86, 87, 88, 89, 90

Youngstown Sheet & Tube Co. 57
Yuba Consolidated Industries 121

Association Affairs

Industrial Menu Told

Electrical Maintenance Engineers Assn. of Southern California announces a strong program for the conference it will hold in connection with the ninth biennial Electrical Industry Show at Shrine Exposition Hall, Los Angeles, March 27 - 29. Further, it states that more exhibit space has been contracted for than for any previous show. Paul H. Henrichs, Southern California Edison Co., is chairman of the EMEA show committee.

Subjects to be covered in panel-type sessions and the chairman of each are as follows: Small Industry Looks at Maintenance of Electrical Equipment, Frank Tharp, chairman, Fluorescent & Floodlight Maintenance Co.; How to Estimate Additions and Extensions, Charles H. Hays, Electrical Estimators Inc. (and EMEA president); Know Your Electrical Codes and Safety Orders, King Christopher, Clark Controller Co.; Maintenance, K. Lee Alvey, AirResearch Mfg. Co.; Protective Devices Must Be Properly Selected and Maintained, T. P. Regas, BullDog Electric Products of Los Angeles; High Power Factor Can Pay Big Dividends, W. H. Warren Jr., Southern California Edison Co.; Large Industry Looks at Maintenance of Electrical Equipment, Kenneth T. Shar, Westinghouse Electric Corp.; Proper Maintenance of Lighting Will Assure Peak Output, Urban Beh, consulting engineer; Plan Maintenance to Prevent Breakdown, W. E. Cline, General Electric Co.; Commercial Buildings Look at Maintenance of Electrical Equipment, Edmund Lanski, I-T-E Circuit Breaker Co.

► **Stanley G. Martz,** General Electric Co., Portland, will be the 1958 president of the Electric Club of Oregon. He was elected Dec. 5 to succeed L. J. "Jerry" Collins, Portland General Electric Co., who presided through 1957. Martz, who will be installed in January, will have the following associates on the executive board: first vice-president, Joseph H. Liebrich, Pacific Power & Light; second vice-president, Rex G. Thurber, Bonneville Power Administration; sergeant-at-arms, Fred A. Waker, Crouse-Hinds Co.; treasurer, Harry L. Clark, Portland GE; secretary, Leonard A. Kallen; and board members at large, Kenneth B. Robinson, Westinghouse Electric Corp.; Mel H. Evans, Portland GE; Alden F. Krieg, Northwest Electric Light & Power Assn.; and John V. Mulcahy, BPA.

► **Terrence Tilley** of Denver, regional manager of Thomas Industries Inc., was elected president of the Rocky Mountain Electrical Manufacturers Representative Club Inc. Tilley succeeds Glenn B. Gaer, president of Gaer Sales Co.

Other officers elected at the annual meeting are Kenneth Schumann, vice-president; George Kaub, secretary; Tony Karpisek, treasurer; Norman Mains, sergeant - at - arms. Directors besides Tilley, Gaer and Schumann are Arthur Peterson, C. D. Belt and Don Hood.

► Home lighting with a panel consisting of A. O. Grotenhuis of Thomas Industries, Denver; F. H. Rosenquist, commercial lighting department, Public Service Co. of Colorado, Denver; and Georgia Fielden, interior designer, Colorado Springs, brought the Rocky Mountain and Southern Colorado Chapters of IES together Nov. 21 for a stimulating evening at Colorado Springs.

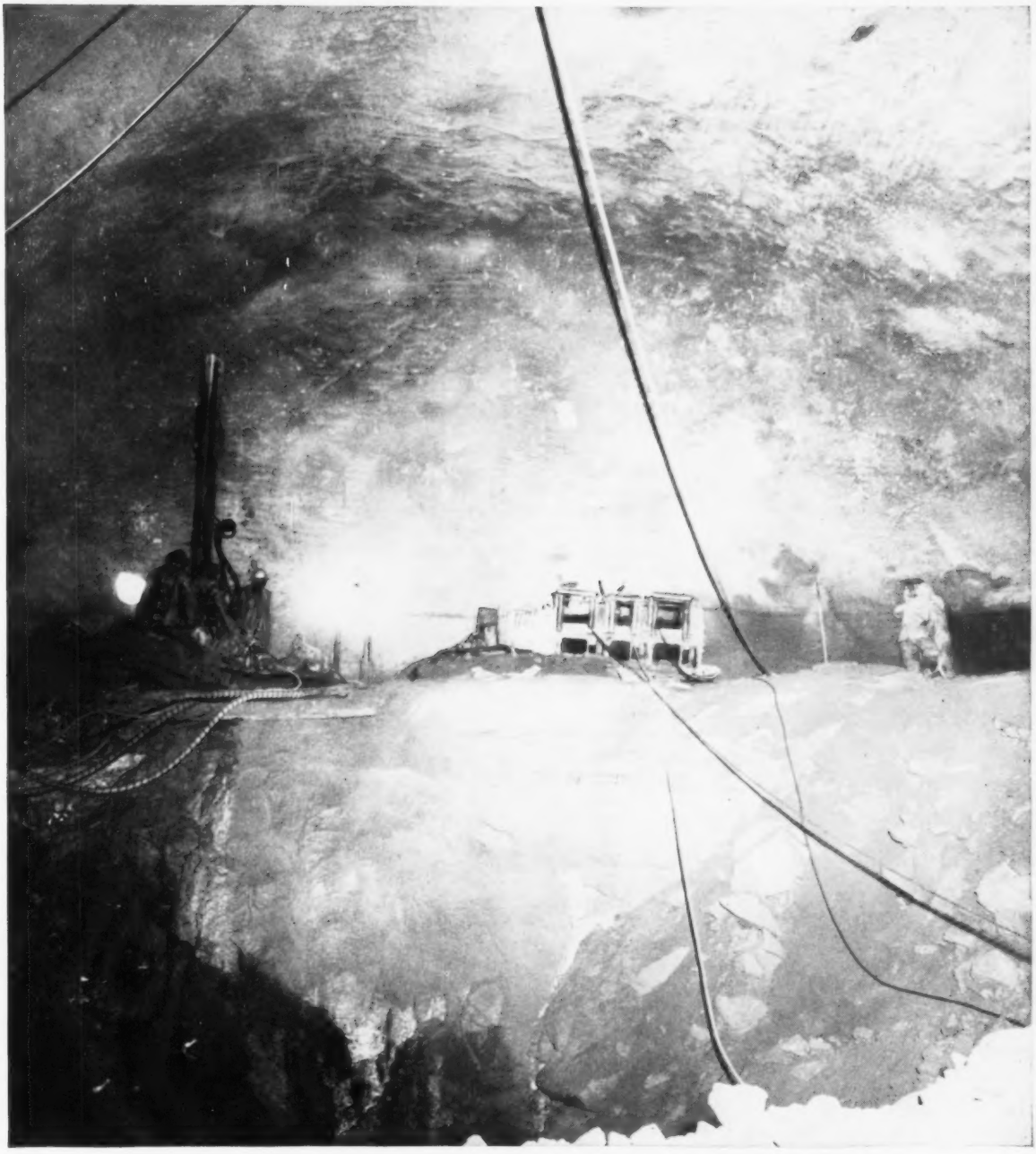
Still Going Up

An estimated attendance of 190,000 was given for the 25th anniversary Electrical and Home Appliance Show staged in San Diego's Balboa Park Electrical Building by the San Diego County Bureau of Home Appliances Nov. 29 through Dec. 4.

J. Clark Chamberlain, show director and manager of the bureau, said the attendance figures exceeded the previous record attendance of 185,000 for a pre-Christmas show.

► **Southern California Chapter, IAEI,** elected S. G. Marrocco, Riverside city inspector, as its chairman; E. V. Muller, California Division of Industrial Safety, vice-chairman; and C. D. Metzger, Long Beach chief inspector, secretary - treasurer. Dates and places for the chapter meetings in 1958 were also set. Pasadena will have the meeting Jan. 29, San Diego March 26, and Long Beach May 21, Riverside July 23; Anaheim Nov. 5.

► **Newly formed chapter** of National Industrial Service Assn. in the Rocky Mountain area meeting in Durango, Colo., recently elected Damon Ward, Ward Electric, Denver, as its president. The spring meeting will be held in Denver March 21-22.



2000 feet inside a mountain, P.G. and E. is building America's first major underground hydroelectric plant. This is part of the Kings River project that will mean an additional 261,500 kilowatts of electricity for growing California.

Since 1946, P. G. and E. has invested nearly $1¾ billion in new facilities. And to keep ahead of California's lightning growth, P. G. and E.'s expansion program is pushing forward at an average of nearly $200 million a year. Business, homes and farms are thus assured a continuing supply of low cost gas and electricity . . . in the 47 California counties served by P. G. and E. • **Pacific Gas and Electric Company**

HOUSE POWER

LIVE BETTER ELECTRICALLY

ADD THIS UP FOR YOURSELF...

Your *Live Better Electrically* and *Housepower* programs have the support of your entire electrical industry for a very practical reason:

They benefit everyone in the industry by selling people the advantages of living electrically in the Electrical Age.

In 1958, these two programs will be bigger and better than ever. When you tie-in with them you help the whole industry and yourself.

That's why it's simply good business to feature the *Live Better Electrically* and *Housepower* slogans – and ideas. Spread the word in your company's advertising, on your letterhead, invoices, mailing pieces and in your house organ.

Join in. We'll all do better!

PACIFIC COAST ELECTRICAL ASSOCIATION

530 West Sixth Street, Los Angeles 14, California • 681 Market Street, San Francisco 5, California